EIGHTEENTH ANNUAL REPORT

OF THE

Ohio State Board of Agriculture,

WITH

AN ABSTRACT OF THE PROCEEDINGS

OF THE

COUNTY AGRICULTURAL SOCIETIES:

TO THE

GENERAL ASSEMBLY OF OHIO, FOR THE YEAR 1863.

COLUMBUS:
RICHARD NEVINS, STATE PRINTER.
1864.

INDEX.

PRESIDENT'S REPORT.

To the General Assembly of the State of Ohio:

The Eighteenth Annual Report of the Ohio State Board of Agriculture is herewith respectfully submitted to your honorable body. The Report will be found to embrace, as the law directs, "the proceedings of the Board for the past year, and an abstract of the proceedings of the several County Agricultural Societies, as well as a general view of the condition of agriculture throughout the State," &c.

The active operations of the Board for the past year have been limited to making the necessary arrangements for holding the Annual State Fair, and to give encouragement, by means of premiums, to the better culture of some important field crops. The Annual Fair was held in the city of Cleveland, and was well attended, and doubtless contributed greatly to stimulate those present to attempt the better management of their farms, and higher styles of culture.

The reports from County Societies give evidence that the agriculture of the State was not paralyzed by the withdrawal of laborers from the State for the defense of the country. The increased use of machinery, moved by animal, water, and steam power, in farming operations, has enabled farmers to accomplish the usual amount of labor with a diminished number of hands. The County Fairs of this year have been better attended than those of last year, and have been held in a larger number of counties.

For a general statement of the condition of the agriculture of the State, you are respectfully referred to the report on this subject, made to the Board by its Corresponding Secretary.

An exhibit of the financial condition of the Board will be found in the Treasurer's report. It will be seen from this that a larger balance now stands to the credit of the Board than at any previous period of its history.

The Board would again respectfully but earnestly recommend the acceptance, on the part of the State of Ohio, of the grant of land made by Congress for the establishment and support of agricultural schools. There

cannot be a question among the well informed of the utility of such institutions, neither can there be much doubt of the great necessity of such an institution in Ohio at the present time. Nearly every other Northern State has already accepted the Congressional grant on the conditions specified, and has thus obtained an advantage over Ohio of earlier and better selections from the public domain.

The Board would also again urge the propriety of an annual appropriation of $3,000 to defray the expenses of this Board, and for the promotion of its objects, in lieu of the present agricultural fund derived from escheats of lands and show licenses. The revenue of the Board derived from these sources has been so irregular and uncertain as seriously to embarrass the operations of the Board, and to prevent any systematic course of investigations and experiments, which would otherwise have been undertaken. It is with regret on the part of the Board that its operations have been thus limited by the want of funds. Agricultural surveys, original investigations and experiments, the publication of a quarterly journal, with other kindred labors, would have been cheerfully undertaken, if the sum placed annually at the disposal of the Board would have justified the expenditure.

Trusting that the General Assembly will be able to devise measures adapted to promote not only the interests of agriculture, but all the best interests of the State,

I am your obedient servant,

N. S. TOWNSHEND,

President of the Board.

AVON, Dec. 31st, 1863.

TREASURER'S STATEMENT.

RECEIPTS.

Cash on hand from last settlement		$ 344 98	
" proceeds of note discounted at Franklin Bank		1,400 00	
" from Cleveland subscription		4,000 00	
" rent of Dining Halls		500 00	
" from Treasurer of State		2,408 21	
" " lumber sold to W. J. Waterson		4,000 00	
" " " " W. R. Mould		300 83	
" " State Fair—First day	$ 735		
" " " Second "	3,428		
" " " Third "	6,459		
" " " Fourth "	520	11,142 00	
" Diplomas to J. J. Low		3 00	
			$24,099 02

EXPENDITURES.

Fair of 1862 (balances due to).

Paid Baldwin, De Witt & Co.	$575 75	
" " " interest	18 75	
" G. Worthington & Co., hardware	274 09	
" W. Bingham & Co., "	50 24	
" Parrish & Knight, "	10 89	
" Mr. Outhwaite (lease of ground)	25 00	
" Columbus Machine Co. (use of engine)	131 50	
" Goodale & Co. (wool department)	15 00	
" Wm. De Witt (personal expenses)	21 28	
" Interest of Mould note of $500	4 48	
" " note discounted in Franklin Bank	57 40	
" J. B. Clegg, due from Dayton Fair of 1861	6 50	
" J. Terrill, " Fair of 1862	4 00	
" Wm. De Witt, for draft protested	851 56	
" W. J. Waterson, for superintending labor on grounds	366 90	
		$2,412 44

EXPENSE OF FAIR GROUNDS IN 1863.

Paid Pliny B. Young, for lumber	271 40	
" W. J. Waterson, for superintending labor on grounds	30 00	
" Mr. Dutton, for teaming and sundries, per voucher	64 82	
" Livery hire (to Stevens, Dutton and others)	41 00	
" Colwell, for hardware	57 71	
" J. Proudfoot, for painting	9 90	
" B. P. Bowers (plumbing)	7 99	
" J. V. N. Yates (wood for Power Hall)	19 00	
" H. Moore (use of furniture)	9 32	
" Sundry Ex. Com. expenses, per De Witt's voucher	54 85	
		565 99

Marshals.

Paid L. C. Sturgis	15 00	
" G. F. Hutchins	15 00	
" A. A. Jewett	12 00	
" Homer Strong	12 00	
		54 00

Gate Keepers.

Paid J. Balderson	12 00
" R. Brush	9 00

Paid R. Balderson	$14 00	
" Fred. Hurst	15 00	
" W. A. Graham	12 00	
" G. W. Clark	12 00	
" Z. M. Hubbell	6 00	
" J. Keenan	12 00	
		$92 00

Superintendents.

Paid J. Kirkpatrick, services and material furnished	68 68	
" Hiram Harris (horses)	15 00	
" E. T. Sturtevant (Domestic Hall)	19 00	
" B. H. Boehmer (Floral Hall)	8 00	
" J. E. Hopkins (Fine Art Hall)	16 50	
" Jay Terrill	12 00	
" H. P. Canon (Farm Product Hall)	12 00	
" G. W. Campbell (Fruit Hall)	15 00	
" Mr. Gribble	10 00	
" Mr. Hight	15 00	
" A. L. Beswick	2 00	
" Danks, Cassel & Powers	24 00	
" M. A. Brown (Power Hall)	23 00	
" Mr. Walker (Farm Implements)	15 00	
" T. P. Donnelly	15 00	
" A. E. Massey (Fruit Hall)	12 00	
" H. L. Hollister	8 00	
" H. Riehter	6 00	
" Mrs. Steiner (Ladies' Hall	6 00	
" W. W. Rathbone (Sheep)	21 00	
" R. N. Jones (Cattle)	21 00	
" Mr. Palmer (Horses	6 00	
		350 18

Police.

Paid J. N. Frazee for police force, per contract		452 00

Music.

Paid J. M. Leland	150 00	
" J. P. Brown	90 00	
		240 00

Forage.

Paid Josiah Hurst		622 13

Refreshments.

Paid W. R. Mould	323 70	
" J. P. Ross (Hotel bill)	243 50	
		567 20

Printing, Advertising and Engraving.

Paid Benedict, Fairbanks & Co. (posters, adv. and cards)	257 10	
" Richard Nevins (prem. lists, cards and circulars)	320 00	
" Glenn & Thrall (printing badges, &c.)	24 50	
" Harris & Hurd (printing circulars)	12 00	
		613 60
" Harris & Fairchild (advertising)	94 00	
" L. H. Tucker, "	11 75	
" J. T. F. Wright, "	6 00	
" Plain Dealer office, " 1862-3	25 00	
" E. Cowles & Co., "	12 75	
		149 50
" J. Geary & Son (subscription to "Fact")	8 00	
" Manypenny & Miller (subscription to "Statesman," 1862-3)	12 00	
" Hurtt, Allen & Co. (subscription to "Journal")	7 00	
		27 00
" Brainerd & Burridge, view of Fair grounds and sheep cuts	129 00	
" J. Conahan, for stereotyping	6 00	
		135 00

Express, Postage and Telegraph.

Paid	Adams and American Express Companies	$109 30	
"	John Graham, postage and drawer rent	126 05	
"	T. S. Gates, Telegraph agent	6 62	
			$241 97

Ribbons, Badges, &c.

Paid	Kelton, Bancroft & Co	89 40	
"	N. E. Crittenden, for engraving medals	7 50	
			96 90

Stationery.

Paid	N. W. Lefavor (due from 1862)	43 31	
"	do entry paper, binding, and paper boxes for office.	58 91	
"	Corlies, Macy & Co., letter heads	49 50	
"	J. H. Riley & Co	12 20	
"	R. Kennedy	8 50	
"	Stationery in Cleveland	5 95	
			178 37

Members of the Board.

Paid	Wm. De Witt, personal expenses, 1863	50 00	
"	do traveling " 1862 and '63	26 15	
"	H. B. Perkins, 3 years	47 02	
"	N. J. Turney, 2 "	25 50	
"	D. E. Gardner	10 50	
			158 67

Miscellaneous.

Paid	E. Longley, reporting Convention	25 00	
"	T. J. Quinlan, bill posting	15 00	
"	L. F. Allen, Herd Book	5 00	
"	A. D. Kendall, sheetings	26 98	
"	W. P. Fogg, use of crockery	17 69	
"	C. & J. Cooper, use of engine	45 00	
"	R. N. Jones, counterfeit money redeemed	5 00	
"	Josiah Hurst, " " "	3 00	
"	N. B. Marple, gum-arabic, brushes, &c.	11 70	
"	Kilbourne, Kuhns & Co., twine and tacks	10 20	
"	J. B. Cobb & Co., Hawes' Directory	3 00	
"	D. Mahoney, cleaning rooms	24 00	
"	Bank-check stamps	5 00	
"	P. Scurry, drayage	6 61	
"	C. C. & C. R. R. Co., freight and drayage	8 90	
"	Wm. Lathrop, office clerk	62 50	
"	J. P. Ross, use of office	15 00	
"	J. H. Klippart, sundry office expense, per voucher	41 00	
			330 58

Premiums.

Paid	Premiums due from 1862	240 50	
"	" of 1863	4,214 66	
			4,485 16

Clerks.

Paid	Clerks in Secretary's office at Fair	181 00	
"	" Treasurer's " "	....	
			181 00

Total amount brought forward....	$13,188 32
Paid J. H. Klippart on salary	1,234 63
Total	$14,422 95
Cash on hand as per settlement	$9,676 07

MEMBERS OF THE STATE BOARD FOR 1863-4.

1863.

NORTON S. TOWNSHEND, *President*, Avon, Lorain Co.
D. McMILLEN, Jr., *Recording Secretary*, Xenia, Greene Co.
DAVID TAYLOR, *Treasurer*, Columbus, Franklin Co.
WM. DEWITT, Cleveland, Cuyahoga Co.
HENRY B. PERKINS, Warren, Trumbull Co.
DARWIN E. GARDNER, Toledo, Lucas Co.
THOS. C. JONES, Delaware, Delaware Co.
NELSON J. TURNEY, Circleville, Pickaway Co.
JACOB EGBERT,* Lebanon, Warren Co.
WM. R. PUTNAM, Marietta, Washington Co.
JOHN H. KLIPPART, *Corresponding Secretary*, Columbus, O.

1864.

NELSON J. TURNEY, *President*, Circlevelle, Pickaway Co.
WM. F. GREER, *Recording Secretary*, Painesville, Lake Co.
DAVID TAYLOR, *Treasurer*, Columbus, Franklin Co.
THOS. C. JONES, Delaware, Delaware Co.
JAMES FULLINGTON, Milford Centre, Union Co.
WM. B. McCLUNG, Troy, Miami Co,
DARWIN E. GARDNER, Toledo, Lucas Co.
WM. DEWITT,† Cleveland, Cuyahoga Co.
WM. R. PUTNAM, Marietta, Washington Co.
DAN'L McMILLEN, Jr., Xenia, Greene Co.
JOHN H. KLIPPART, *Cor. Secretary*, Columbus, Franklin Co.

EXECUTIVE COMMITTEE FOR 1864,

N. J. TURNEY, *Pres't*, T. C. JONES, D. McMILLEN, Jr., D. TAYLOR.

* Died, February, 1863.

† Killed, May 21, 1864, on railroad.

LIST OF MEMBERS OF BOARD FOR FIFTEEN YEARS.

1850—FAIR AT CINCINNATI.

M. L. Sullivant, President	Columbus.
S. Medary, Treasurer	Columbus.
M. B. Bateham, Secretary	Columbus.
*D. Lapham	Cincinnati.
F. R. Elliott	Cleveland.
J. T. Pugsley	Convenience.
Arthur Watts	Chillicothe.
J. M. Edwards	Canfield.
C. Springer	Meadow Farm.
J. G. Gest	Xenia.

Receipts, $7,284 96.

1851—FAIR AT COLUMBUS.

M. L. Sullivant, President	Columbus.
S. Medary, Treasurer	Columbus.
J. G. Gest, Recording Secretary	Xenia.
W. W. Mather, Cor. Secretary	Columbus.
F. R. Elliott	Cleveland.
J. T. Pugsley	Convenience.
S. Halloway	St. Clairsville.
Allen Trimble	Hillsboro.
C. Springer	Meadow Farm.
J. M. Edwarks	Canfield.
Arthur Watts	Chillicothe.

Receipts, $8,204 09.

1852—FAIR AT CLEVELAND.

Arthur Watts, President	Chillicothe.
S. Medary, Treasurer	Columbus.
J. G. Gest, Recording Secretary	Xenia.
*W. W. Mather, Cor. Secretary	Columbus.
C. Springer	Meadow Farm.
Allen Trimble	Hillsboro.
J. M. Edwards	Canfield.
Wm. Case	Cleveland.
Philo Adams	Huron.
R. W. Musgrave	Sulphur Springs.

Receipts, $13,260.

1853—FAIR AT DAYTON.

*S. Medary, President	Columbus.
M. L. Sullivant, Treasurer	Columbus.
J. G. Gest, Recording Secretary	Xenia.
G. Sprague, Corresponding Sec'y	Columbus.
*Wm. Case	Cleveland.
*Philo Adams	Huron.
R. W. Musgrave	Sulphur Springs.
R. W. Steele	Dayton.
Wm. H. Ladd	Richmond.
D. McIntosh	Shalersville.
J. T. Worthington	Chilicothe.

Receipts, $13,996 37.

1854—FAIR AT NEWARK.

R. W. Musgrave, President	Sulphur Springs.
Jos. Sullivant, Treasurer	Columbus.
Jas. L. Cox, Recording Sec'y	Zanesville.
G. Sprague, Corresponding Sec'y	Columbus.
W. H. Ladd	Richmond.
J. T. Worthington	Chillicothe.
D. McIntosh	Shalersville.
R. W. Steele	Dayton.
*J. G. Gest	Xenia.
J. K. Green	Carthage.
B. Stedman	Cleveland.

Receipts, $8,824 58.

* Deceased.

1855—FAIR AT COLUMBUS.

J. T. Worthington, President....Chillicothe.
Jos. Sullivant, Treasurer........Columbus.
Jno. K. Green, Recording Sec'y ...Carthage.
G. Sprague, Corresponding Sec'y..Columbus.
R. W. Steele.....................Dayton.
R. W. Musgrave...........Sulphur Springs.
B. Stedman....................Cleveland.
J. L. Cox.......................Zanesville.
W. H. Ladd....................Richmond.
Alex. Waddle............South Charleston.
Abel Krum................Cherry Valley.

Receipts, $9,745 54.

1856—FAIR AT CLEVELAND.

W. H. Ladd, President..........Richmond.
Lucian Buttles, Treasurer........Columbus.
Jno. K. Green, Recording Sec'y ...Carthage.
G. Sprague, Corresponding Sec'y..Columbus.
Jas. T. Worthington............Chillicothe.
R. W. Musgrave...........Sulphur Springs.
R. W. Steele......................Dayton.
B. Stedman....................Cleveland.
Alex. Waddle............South Charleston.
Abel Krum................Cherry Valley.
G. W. Barker....................Marietta.

Receipts, $16,649 20.

1857—FAIR AT CINCINNATI.

Alex. Waddle, President..South Charleston.
Lucian Buttles, Treasurer........Columbus.
J. M. Millikin, Rec. Secretary.....Hamilton.
J. H. Klippart, Cor. Secretary....Columbus.
Luther Smith...............West Liberty.
Jno. K. Green..................Carthage.
B. Stedman....................Cleveland.
A. Krum..................Cherry Valley.
G. W. Barker....................Marietta.
R. W. Musgrave..........Sulphur Springs.
Thomas S. Webb...............Massillon.

Receipts, $17,530 75.

1858—FAIR AT SANDUSKY.

John M. Millikin, President.......Hamilton.
Lucian Buttles, Treasurer.......Columbus.
Norton S. Townsend, Rec. Sec'y......Avon.
John H. Klippart, Cor. Secretary..Columbus.
Alex. Waddle............South Charleston.
Abel Krum................Cherry Valley.
Luther Smith................West Liberty.
T. S. Webb....................Massillon.
L. Q. Rawson....................Fremont.
James M. Trimble...............Hillsboro.
John Reber.....................Lancaster.

Receipts, $9,997 70.

1859—FAIR AT ZANESVILLE.

Norton S. Townsend, President.......Avon.
Darwin E. Gardner, Rec. Secretary...Toledo.
Lucian Buttles, Treasurer........Columbus.
Alex. Waddle............South Charleston.
James M. Trimble...............Hillsboro.
Wm. Dewitt....................Cleveland.
John Reber....................Lancaster.
John M. Millikin................Hamilton.
L. Q. Rawson....................Fremont.
C. W. Potwin...................Zanesville.
John H. Klippart, Cor. Secretary..Columbus.

Receipts, $8,958 82.

1860—FAIR AT DAYTON.

Alex. Waddle, President...South Charleston.
T. C. Jones, Rec. Secretary.......Delaware.
C. W. Potwin, Treasurer.........Zanesville.
N. S. Townsend.......................Avon.
Darwin E. Gardner...................Toledo.
Henry B. Berkins.................Warren.
James M. Trimble...............Hillsboro.
Wm. Dewitt....................Cleveland.
John Reber....................Lancaster.
John M. Millikin................Hamilton.
John H. Klippart, Cor. Secretary..Columbus.

Receipts, $11,999 50.

1861—FAIR AT DAYTON.

Darwin E. Gardner, President.......Toledo.
Wm. Dewitt, Rec. Secretary......Cleveland.
C. W. Potwin, Treasurer........Zanesville.
N. S. Townsend......................Avon.
T. C. Jones......................Delaware.
Henry B. Perkins..................Warren.
James M. Trimble...............Hillsboro.
David Taylor..................Columbus.
John Reber....................Lancaster.
John M. Millikin................Hamilton.
John H. Klippart, Cor. Secretary..Columbus.

Receipts, $8,036 18.

1862—FAIR AT CLEVELAND.

T. C. Jones, President............Delaware.
Henry B. Perkins, Rec. Secretary...Warren.
David Taylor, Treasurer.........Columbus.
John M. Millikin................Hamilton.
Darwin E. Gardner................Toledo.
Wm. Dewitt....................Cleveland.
C. W. Potwin..................Zanesville.
N. S. Townshend....................Avon.
Jacob Egbert....................Lebanon.
Nelson J. Turney..............Circleville.
John H. Klippart, Cor. Secretary..Columbus.

Receipts, $11,266 64.

1863—FAIR AT CLEVELAND.

Norton S. Townsend, President.......Avon.
D. McMillen, Jr., Rec. Secretary.....Xenia.
David Taylor, Treasurer.........Columbus.
Wm. Dewitt....................Cleveland.
Henry B. Perkins.................Warren.
Darwin E. Gardner................Toledo.
Thos. C. Jones..................Delaware.
Nelson J. Turney..............Circleville.
*Jacob Egbert....................Lebanon.
W. R. Putnam...................Marietta.
John H. Klippart, Cor. Secretary..Columbus.

Receipts, $11,142.

1864—FAIR AT COLUMBUS.

Nelson J. Turney, President.....Circleville.
W. F. Greer, Rec. Secretary.....Painesville.
David Taylor, Treasurer.........Columbus.
Thos. C. Jones..................Delaware.
James Fullington..........Milford Centre.
W. B. McLung......................Troy.
Darwin E. Gardner................Toledo.
*Wm. Dewitt....................Cleveland.
Wm. R. Putnam..................Marietta.
Danl. McMillen, Jr...................Xenia.
John H. Klippart, Cor. Secretary..Columbus.

Receipts, $12,620 54.

Average amount received at each Fair for admission fees, $11,307 12.

---

* Deceased.

ERRATA.

In Mr. Waddle's reply to Mr. Gates, on page 22, read "for every Shorthorn we had paid $12.30," instead of "$123."

There are many errors, consisting of omission of words, incorrect orthography, &c., sufficient to fill a page, but the intelligent reader will be able to supply the omissions and correct the orthography.

CONDITION OF AGRICULTURE IN OHIO IN 1863.

In his work on the Rural Economy of France,* Mr. Lavergne discusses the question, "What has been the influence of the Revolution of 1789 upon the agriculture of France?" throughout a work of 475 duodecimo pages, in which he says: "If we compare the condition of agriculture in 1789 with that of 1859, we will find that very great progress has been made in these seventy years. This progress is, for the greater part, attributable to new principles which the revolution has introduced into our laws."

What were these new principles evolved by the revolution? "Before the revolution," Mr. Lavergne proceeds to inform us, "the church and nobility owned about three-fourths of the territory of France; here and there a wealthy bourgeois, or well-to-do farmer, owned a small tract. The nobility and church not only dictated the price at which agricultural products must be sold by the producer, but dictated the number of acres to be grown in any special crop, and the amount of seed to be sown per acre." The consequence of this church and nobility farming "produced a famine throughout the land about every tenth year." The farmers of one department were not permitted, under penalty of death, to sell their surplus breadstuffs to an adjoining, or other department; and any one, whether noble or peasant, who would dare to export any breadstuffs without royal permission, was sure to suffer the death penalty. Hence the mobs and riots to obtain bread; it could not be purchased, for the peasants dared not to sell. The revolution confiscated the lands of the church and nobility, as well as of the loyal bourgeoise and farmers; free trade among the departments in breadstuffs was declared; and no dictator, except the farmer's own judgment, prescribed the amount of seed per acre, nor indicated the fields to be cultivated in this or that kind of crop, whilst the price was regulated by supply and demand.

These radical changes, all of the utmost importance and advantage to the French farmer, were brought about by the revolution of 1789. But

---

* Economie Rurale *de la France*, depuis 1789, par M. de Lavergne, membre de l'Institut, de la société centrale d'Agriculture de France, ancient député. Paris, Deuxieme edition, 1861.

during the revolution the condition of agriculture was in the most deplorable condition imaginable; there was no stimulus to labor, and productive industry was almost suspended. None knew what a day might bring forth. Life was sacrificed upon the slightest pretexts, and there was no security whatever to property. "War to the castles, but peace to the cottages," was the cry of the armed mob as it patrolled France; but the agricultural relations of the cottages to the castles were so close, that when the latter were burned, the former were destroyed.

In other words, the French revolution of 1789 laid the foundation of a rational and free system of agriculture. Agriculture was no longer burthened with tythes, *champerties*, and perpetual ground rents, in addition to the taxes; it had also what it never before enjoyed in France, free commerce amongst the departments. All these circumstances combined, together with agricultural schools, have more than doubled the crop products of France since the revolution, whilst the population has not increased more than 33 per cent. The following figures show the difference in the distribution of the kinds of crops:

Kind of Crop.	1789. Hectares.*	1859. Hectares.
Fallows	10,000,000	5,000,000
Wheat	4,000,000	6,000,000
Rye and other grains	7,000,000	6,000,000
Oats	2,500,000	3,000,000
Meadows	1,000,000	3,000,000
Root crops	100,000	2,000,000
Miscellaneous	400,000	1,000,000
Gardens and orchards	1,500,000	2,000,000
Vineyards	1,500,000	2,000,000
Forests	9,000,000	8,000,000
Natural meadows	3,000,000	4,000,000
Waste land	10,000,000	8,000,000
	50,000,000	50,000,000

The revolution has reduced the area in fallows to one half of its former dimensions. No wonder that in 1789 Arthur Young, who was then traveling in France, wrote: "The Prince of Soubise and the Duke of Bouillon are the two greatest proprietors in France; but the only evidence I have as yet discovered of their grandeur, are their immense fallows, uncultivated lands and deserts. Ah! if I were only for several days a legislator of France, how I would make these grand signeurs dance!" It struck even Arthur Young, Englishman as he was, that 20 per cent. of the entire area of a country was too much to lie fallow.

As we are approaching the fourth year of the rebellion, we may ask,

* The *Hectare* is very near 2½ acres.

"What influence has the Rebellion of 1861 had upon the Agriculture of Ohio?" No such radical changes were necessary for the advancement of agriculture in Ohio, as were imperatively demanded in France. Here almost every farmer owns the soil he cultivates; here are no feudal liens of any kind upon his lands or his crops; the only thing with which he is burdened is taxation, but even this burden, grievous and onerous as it is regarded by many, does not amount to one half of what the tithes alone amounted to in France, not to mention the taxes, gratuities, *champerties*, and other feudal exactions, which annually swept away more than one half of the farmer's product.

The influence of the rebellion has been beneficial to the Agriculture of Ohio, rather than otherwise, for the following reasons:

First, It has taught the farmers economy in labor.

Second, It has rendered an improved system of culture absolutely necessary.

Third, It has demonstrated the true relation which labor holds to capital.

I. The following table, carefully compiled from official returns, fully demonstrates that the area cultivated during the three years of war—1861, 1862 and 1863—has not sensibly diminished; that the aggregate area cultivated during these years will compare very favorably, indeed, with the aggregate of any consecutive three years preceding the rebellion:

Kind of Crop.	1858. Acres cultivated.	1859. Acres cultivated.	1860. Acres cultivated.	1861. Acres cultivated.	1862. Acres cultivated.	1863. Acres cultivated.	Crop of 1863. Per cent. of area in.
Wheat	1,695,412	1,790,627	1,844,677	1,933,696	2,090,047	1,807,298	28.49
Rye	90,191	98,011	94,934	69,374	67,440	32,306	0.509
Barley	125,745	102,729	71,564	60,501	59,128	73,804	1.164
Buckwheat	71,282	149,645	66,827	51,389	23,508	26,991	0.425
Corn	1,834,138	2,339,204	2,397,639	2,266,129	2,175,531	1,992,007	31.41
Oats	669,147	644,954	830,104	728,722	574,047	573,287	9.036
Meadow	1,357,874	1,340,566	1,538,562	1,461,018	1,571,765	1,177,573	18.56
Clover	....	....	....	....	....	403,882	6.366
Flax	....	....	....	....	53,488	95,271½	1.502
Potatoes	....	....	....	....	81,060	80,690	1.272
Tobacco	....	....	....	....	....	49,207	.775
Sorgo	....	....	....	....	30,872	31,178	.491
	5,843,789	6,465,736	6,844,307	6,570,829	6,561,466	6,343,494½	100.

Crop of 1863—per cent. of acres which may be used as human food.......... 63.760
" " " " " " for domestic animals..... 33.963
" " " " " " for commercial plants.... 2.276

This result could not have been obtained if the farmers had not economized labor, because at least from one-third to one-fourth of the ordinary

farm laborers were transferred to the battle-fields, and in many instances the farmers themselves; and the entire amount of farm labor was performed by those who remained at home. By economy of labor it is not intended to convey the idea that the labor was not performed, but it is intended to convey the idea that the labor was more judiciously applied than is usually done, and that it was directed in such a manner as to secure the best and most profitable results. Economy is *one* thing, but parsimony is quite another. That man is economical in the expenditure of money, which, notwithstanding it may appear to be very liberal, yet is applied in the most judicious manner—in such a manner as to secure the best possible results; but that man, on the contrary, is parsimonious who will not expend any money which, if judiciously applied, would inure to his benefit. The farmers of Ohio during the rebellion have economized labor, and singular as it may appear, this same economy of labor has brought with it a better system of culture; that is, the culture of both soil and plants has been more thorough than heretofore. Much of this thoroughness is undoubtedly attributable to the fact that machinery and improved implements have been employed to a much greater extent during the years of rebellion than ever before. During the profound peace which preceded the rebellion, farmers were not content that a machine would answer the purpose for which it was intended, or that it would perform the labor better than could be done in the usual manual form; they insisted that there must be a positive gain in a pecuniary sense, or in other words, that the machine must perform the labor *cheaper* than men could be hired to do it with their hands, before they would purchase it. It does not appear to have occurred to them, as a general thing, that the amount of time gained, and the superior manner, especially so far as uniformity is concerned, in which a machine operates, were positive gains. A field which has been cultivated in a uniform manner, is always more productive than the same field irregularly cultivated. A field plowed at a uniform depth of 8 inches is much more productive than the same field plowed, a portion 4 inches deep, and another portion 12; and this is a fair illustration of the superiority of machine labor over the usual unskilled manual labor.

Without drills, corn-planters, reapers and mowers, horse-rakes, hay elevators, and threshing machines, it would have been impossible to have seeded and gathered the crops of 1863 with the implements in use forty or fifty years ago, by the same laborers that really performed the labor in 1863. Supplying the place of bone and muscle with iron, steel, steam and horse power, is an encouraging indication of great improvement and consequent progress in our system of agriculture. And the future promises more aid in the way of machinery than the past has as yet accomplished.

A much greater area of land could be cultivated by the present agricultural force, if some implement or machine were invented by which a greater number of acres could be plowed, or prepared as a seed-bed, in the limited time allotted for that purpose. Convinced not only of the necessity but the practicability of such a machine, Mr. Cicero Comstock, a native of Franklin county, O., but now of Milwaukie, invented a machine which, up to the present time, has given the most perfect satisfaction. The following letter, written by an intelligent gentleman, conveys a clear idea of the structure and operation of this machine. The letter was addressed to the *Chicago Tribune:*

Champaign, Ill., June 19, 1864.

The readers of the Tribune will bear in mind that within the past two years I have made mention of attempts to cultivate the soil by spading instead of plowing. It is with no small amount of pleasure that I can announce the full accomplishment of the fact, on a scale that has put it beyond a doubt.

During the latter part of April and the month of May, five hundred and ten acres have been successfully spaded to the depth of eight inches, and the whole of it planted to corn.

Last week I spent two days on the farm of M. L. Sullivant, in this county, for the purpose of examining this new mode of preparing the soil, and will proceed to give a somewhat detailed account of it:

The machine is called Comstock's Rotary Spader, is made of metal, and cost about two hundred dollars. There are four of them at work, each in some respect different from the others.

In the first place, the machine consists of a cylindrical cast-iron frame, in the ends of which are cam slats, in which the forks to which the tines are attached work. These in passing around the drum have their direction changed by a stationary eccentric, which brings them in position to enter the ground at the front, and so soon as they have passed the centre, to fold back on the machine. They can also be folded up in passing around the head of the land, or in passing to and from the field. The tines enter the ground in a natural projection, like the spade in the hands of a man, and leaving the ground lift the soil in the same way, giving it a sudden shake by which it is broken up and left in a fine condition. The lifting and shaking of the earth behind the machine keeps it in a constant flutter, like the water after a stern-wheel steamer.

LARGE FOUR-HORSE SPADER.

This spader is three feet long, with a cylinder of two feet diameter, has twelve forks with six tines each. The cut is six and a quarter inches, that is, the spading tines enter the ground that distance apart. This distance is uniform in all the machines. This machine had been run twenty-six and three-fourth days, and in that time spaded one hundred and sixty acres, being an average of six acres a day.

SMALL FOUR-HORSE SPADER.

This spader is twenty-one inches in diameter, has ten forks, with five tines each. Being less in diameter, the motion is about one-fifth quicker than the large spader, and having less tines, it requires apparently less power. In every respect this is the best machine, and the one for general use.

This machine has worked twenty-six and one-fourth days, the most of the time on the same lands with the other; it is driven by a boy, and has spaded one hundred and sixty acres. Here are three hundred and twenty acres—just a half section—spaded to the depth of eight inches by the use of eight horses and two men, in less than twenty-seven working days.

The teams attached to these machines travel at the rate of two and three-eighths miles an hour, which will give for ten hours' work something over the six acres, but there is always a loss of time in turning and other stoppages, and the only safe way to get at the amount of work done, is stated above, by taking the actual performance of several days.

To plow an acre with the furrow slice a foot wide, requires eight and one fifth miles of travel, besides turning at the ends of the lands, and is just about what a good team will average in half a day; in fact, unless the lands are half a mile long, they will seldom accomplish this amount, and often plow only three-fourths of an acre, or an average of one and a half acres per day. As a general thing, the average plowing may be set down at ten acres a week to each team. It will be seen that the spade traveled sixteen and a half miles a day, besides passing around at the ends, and going to and from the field. The horses have stood the work equally well with the plow teams, of which there are twenty spans at work in the same field. The driver rides, and would as soon take care of four horses and work this machine, as to have the care of two horses and follow at the tail of the plow. The horses are driven abreast, the off one walking on the spaded ground. In this way they are easily managed, and any person who can manage a single team and plow, can drive the four horses on the spader.

A team hauling a load on a solid road, will travel more miles in a day, but in plowing, we must take into consideration numerous stoppages that take, in the aggregate, no little amount of time. The teams that work the two spaders are no more than a fair average of farm teams, either as to size or speed, and the result may be taken as a fair average of what may be expected of the performance of the spades. I have seen various figures and estimates in this connection, some of which make the work an acre to the hour; doubtless this can be done for a single hour, but I prefer the actual showing of a month's work, as above.

THE SAVING OF LABOR.

It will be seen that one man and four horses spade as much in a day as three men and six horses turn over in the same time with a plow, making the saving of one team and two men, leaving the account to stand thus:

One day of team and man	$3 00
One day of team	1 50
	$4 50
Spading six acres a day, at the cost of seventy-five cents an acre; three days team and man plowing	$9 00

Plowing six acres at a cost of $1 50 per acre, thus saving by the use of the spader one-half of the cost of preparing the land for planting, without taking into account the extra cost of the spader over that of three plows, but this can be offset against the cost of sharpening the plows, which expense is not required on the spader, as the tines are self-sharpening. The three dollars a day are intended to cover the use of machine and other repairs in either case.

The spader pulverizes the soil to the depth of eight inches, while the average of spring plowing for corn is not to exceed four inches. I am not disposed in this connection to speculate on the difference in value of the two modes of preparing the soil, but prefer to leave it to the actual fact of the crop, as seventy-five acres have been plowed and spaded in alternate strips of one hundred and thirty feet wide, an amount sufficient for a pretty thorough trial, the after treatment of the whole to be the same. The saving of labor as above stated cannot be controverted, and there cannot in my mind be a reasonable doubt that the crop will show still more astonishing figures in favor of the new mode.

OX TEAM SPADERS.

Two other spaders are used, drawn by three yoke of oxen each. These are with trucks, and the drivers walk. One of these is three feet wide and seventeen inches in diameter, having eight forks with six tines each. The speed of the oxen being slow, not exceeding one and a half miles an hour, the motion of the machine must be regulated by a less diameter. In fourteen days this team spaded fifty-six acres, or four a day. Neither yoke of these cattle could handle a single plow and do good work.

The other spader was made three feet and eight inches wide, intended for the width of a corn row, to which was to be attached a corn-planter. This had not been done, though the idea is not abandoned. This spader has also eight forks, but no increase of tines, the six tines being placed farther apart. This machine was also drawn by three yoke of oxen, and was apparently drawn as easy as the other of less width, the resistance appearing to be in the number of tines used, and not in the width of the machine.

The horse machines had trucks in front, and weigh, trucks included, about nine hundred pounds each, while the ox spaders are without trucks, and weigh six hundred pounds.

With these latter the work is not as well done, from the fact that the speed of oxen is not as regular as that of horses.

The wide machine had worked six days, spading thirty acres, or five acres a day. A trial is to be made with the horse machine, using six tines on a machine three feet and eight inches wide. Should the result prove the same as in the ox machine, it will add an acre a day to its capacity.

The two ox spaders for twelve days were worked in a gang with the six yoke of oxen, and spaded ninety-six acres, or eight acres a day; but they are found to work better separate, and it is not probable, unless very short-handed, that they will be again worked together.

The aggregate amount of spading done to June 1st is five hundred and two acres, at an average cost of seventy-five cents an acre, making a saving of seventy-five dollars on each hundred acres over the use of the plow, a result highly flattering to all interested. This must be looked upon as a vast stride in the field of progress, and will at no distant day have the effect to cheapen the great farm staples, for it is not so much in the saving of labor as in the increased crop that will be produced by the superior work accomplished.

By the use of the spader the soil is loosened up to the depth of eight inches, without throwing to the bottom of the furrow the free potash that has become disintegrated by long exposure to the atmosphere, and which, upon being again buried to that depth, would become fixed, and no longer available to the young plants, which must await the slow process of areation to prepare a new supply.

The farm on which the above experiments are being made, contains twenty-two thousand acres of prairie land, about sixteen thousand of which are under fence, requiring over sixty miles, all of which are posts and boards of a substantial character. The great body of the land is in meadow and pasturing, some fifteen hundred being under the plow. Twelve hundred of this is in corn, one hundred to spring wheat, two hundred to oats, ten to sorgho, and some ten in garden.

This farm is carried on with hired labor, none of it being rented, and in point of economy presents many valuable lessons to the smaller farmer.

When this rotary spader is as generally introduced as the reaping machine—and it will not require many years thus to introduce it—fully one-half of the time spent in pulverizing the soil or preparing the seed bed will be saved; and with the reaping machine to harvest seven to eight acres per day, will not the horizon look much brighter, so far as the manual part of agriculture is concerned?

II. Several causes have conspired to improve the system of culture. The diminished amount of available manual labor convinced every farmer that whatever was done at all would be much better *well done* than done in the usual manner. Labor was too scarce and too expensive to be employed to slight the work. The Scriptural axiom, that "the laborer is worthy of his hire," has been reversed, and the *hire* or wages have been made worthy of the labor. In times of peace, with no disturbing cause to derange our commerce, or direct labor into new channels, and ordinary unskilled manual labor abundant, the price of labor was comparatively low, but since labor has become scarce and expensive, it has also vastly improved in quality, and wherever labor was employed out of the family, it was employed in such a manner as to secure the greatest possible results. Farm labor never has been *dear* in the United States, in comparison with the same kind of labor in *price* in England or France, but ordinary farm labor has been and yet is much more *expensive* in the United States than in England or France, because so much of it is either misapplied or applied to very little purpose. Before the breaking out of the rebellion, $150 per year, including board, lodging, and washing, was considered very fair wages for a farm laborer; or if the laborer was a married man, he would receive perhaps $200 per annum, and would pay the landlord $50 for rent for a small house and a half acre of ground. In England the farm laborer receives an average of ten shillings a week, equal to $2.50 of our money, including board, lodging, and washing, or about $130 per annum, together with gratuities, which there are customary, and which amount to fully $20 per annum. The married farm laborer has the rent of a cottage and from half to a whole acre of garden free, has his fuel and milk delivered at his door free, and the landlord is compelled to find employment for the laborer's wife, at prices ranging from $1.00 to $1.50 per week, besides allowing her time to attend to her household affairs; and he must further furnish employment for all the children, according to their capacity, down to a penny a day. Hence it costs the English landlord from $300 to $400 per annum to have a hired married man on the farm. The expenditure of this sum for labor by the British farmer to a married laborer and his family, pays much better in England than hiring a man for $150 a year does an Ohio farmer; but the secret of this is to be found in the fact that the British farmer applies the labor in such a manner as to secure not only the best but the greatest possible results, whilst the Ohio farmer employs a laborer only to perform such ordinary routine duties as the landlord himself has not time to perform, and very seldom gives himself any concern as to whether it is well or indifferently done. In other words, farm labor in England is completely systematized—the laborer

knows his duty and is willing to perform it, and the landlord knows precisely what to expect from the laborer. But since the breaking out of the rebellion, every agricultural product has met with a ready sale and at greatly augmented prices, it has stimulated the farmer to increase the quantity of his crops and products by every means within his power. The Ohio farmer has therefore given to his avocation that earnest thought which it always should have received from him, and that judicious application of labor which it is passing strange was never before so successfully directed and applied. As a general thing the farmers of Ohio were out of debt at the commencement of the war, and as the price of every thing soon augmented, they as a class made fewer purchases and less in quantity than heretofore, whilst at the same time they were selling every thing they possibly could spare at the highest prices. This induced them to give more careful and earnest attention to their crops, stock, and mode of tillage.

There is another circumstance which it is possible may have had some influence toward inducing a better system of culture, although the manifestations of it are as yet rather slight, yet we think there are sufficient indications to warrant the declaration that it does exist, namely, a less variety of crops are grown on the same farm than formerly. In many localities farmers have learned by experience that either the soil, their mode of tillage, or the local meteorological influences would not warrant the continuance of some special crops, especially when other crops were succeeding so admirably and so remuneratively. They have therefore discontinued the precarious crops, and confined themselves to those with which they had uniformly been more successful. Farming in Ohio would be more eminently successful if this idea would receive its full development in practice. A division of crops among farmers would be in as great a degree beneficial and successful as a division of labor amongst mechanics. Time was, and that not more than two hundred years ago, when the farmers were their own tailors, shoemakers, blacksmiths, tinkers, and agricultural implement makers. In course of time they have by degrees discontinued practicing one and another of these arts, and have relied for their necessary supplies of these various kinds of mechanism on those who made them their special business for life. The result of this division of labor is manifest in the superior mechanical products, the greater amount of time at the farmer's command to attend to his crops, and the consequent improvement of the crops themselves, both in quantity and quality.

In the days of Queen Elizabeth the British farmer produced six bushels only of wheat per acre—the average of England to-day is thirty-three and one-half bushels. If the British farmer of to-day did his own spinning,

weaving, tailoring, shoemaking, blacksmithing, plow and other implement making, as his fathers did, is it reasonable to suppose that his crops would be as abundant as at present, even though he applied all the science to them that he now does? Germany was no better, nay, was worse, for the division and sub-division of estates took place in Germany entirely unknown in England, and with this further difference, that in Germany, like in the United States, the cultivator owned in fee simple the tract he cultivated, which in England is not true of one case in ten thousand.

In Germany there would be found wheat, rye, speltz, barley, buckwheat, oats, clover, flax, potatoes, tobacco, sugar beet, kohlrabi, field peas and beans, hemp, and colza, all grown at the same time, on a tract not exceeding perhaps ten acres, and each particular crop cultivated by a different owner. This evil however carried with it its own antidote; the entire tract is now cultivated in that kind of crop to which it is best adapted, and the proceeds divided amongst the several owners. The result is not only more remunerative crops, but a greatly improved system of culture by the introduction of improved implements and machines. Now if in Ohio such crops only were grown on a farm as are best adapted to that farm, the crops would be better, because the farmer could devote his entire attention to fewer crops, and other things being equal they would be better cultivated, and would of course be more remunerative. Such a division is gradually, and possibly without the knowledge of the parties, being introduced.

Madison county does not pretend to compete with Butler in growing wheat; neither does Stark pretend to compete with Geauga in the production of cheese; nor Harrison to compete with Ross or Pickaway in the production of corn; nor Richland to compete with Montgomery in the production of tobacco; nor Highland with Licking in sheep. But this division should be practiced even in townships or smaller bodies of land. Farming is too mixed—that is, every farmer undertakes to grow too many kinds of crops. Every farmer, almost, undertakes to grow wheat, rye, barley, buckwheat, corn, oats, clover, timothy, flax, potatoes, turnips, sorgho, and some add to these tobacco, broom-corn, and Hungarian grass crops, besides keeping sheep, swine, cattle to fatten, and horses for sale or pleasure. Can *one* man on an average sized farm in Ohio (90 acres) succeed in growing all these crops in perfection? The truth is he has not the time, and very seldom the available means to grow any one of them in perfection. We have put the question to hundreds of intelligent farmers, "Why do you undertake to grow so many kinds of crops?" and have invariably received the same answer, in substance viz.: "That if one fails another may succeed, and out of the whole lot we may have several which will be good crops." If we

accept this answer as the true one, and we have no doubt that it in the main is correct, it shows that farming in Ohio is a very hazardous business.

How much confidence would any one have in the business capacity of a capitalist, who insisted upon it that it was necessary to engage in a half dozen kinds of business, and who would give as a reason that he did so, that in all probability he should lose some of his investments, but would probably gain on others? Is it not clearly his duty and his interest to embark in such only as present to his judgment, when all the circumstances are duly weighed, the greatest probability of success? Would it not be better for a farmer to grow two, or at most three staple crops, such as may be best adapted to his lands, and then prepare his lands expressly for them—plow deep, underdrain, manure liberally, and then devote his time and attention to the growing crop, and purchase or exchange with a neighbor what he really requires of such a crop or crops as he does not grow? One of the most successful farmers of our acquaintance grows no wheat—he formerly grew it, but abandoned it because it did not pay on his land, and because it required his attention to secure it at a period when his time could be bestowed to much better advantage on other crops. Another very successful farmer of my acquaintance grows no corn; he says "*it does not pay;*" that he can grow other crops much more profitably, and with less labor; and states, in conclusion, that it is cheaper to purchase corn at 25c. per bushel (the ordinary price in peace times), than it is to raise 30 bushels per acre on land worth $40 to $50 per acre, when so many much better paying crops may be grown on it, at the same or very little augmented expense. But some farmers will not believe that it is a matter of economy to purchase any thing which will grow on their land; even if they never succeed in getting more than one-fourth of a crop, they still deem it *economy* to grow it. They might possibly purchase for ten dollars all they grow on an acre of one of these non-suited crops, whilst an appropriate or adapted crop would yield them $40 or $50; but they argue that, if they grow the non-suited crop, they are not paying out any money, and the crop costs nothing but their labor, and if the crop does not do well there is not much lost! This *must* be true, certainly, for that labor which can thus be thrown away, or misdirected, cannot surely be worth much.

We have frequently inquired of farmers in the cattle-growing regions, why turnips were not grown for cattle food in winter time? Every one readily admitted the benefit and value of root crops or succulent food for cattle, but the general inference of their replies was, that England grew turnips because she could not grow Indian corn, whilst we could grow corn

in perfection, but could not grow turnips to any advantage. It may possibly be regarded as being very credulous, but we very much doubt if any one has in real earnest endeavored to grow turnips as a crop for cattle food. No Buckeye farmer is willing to admit that they have a better soil in Canada than we have in Ohio, or that their climate is better adapted for agricultural purposes; in order to show what they are doing in the shape of root crops in Canada West, we copy the following from the *Country Gentleman:*

In our Notes of the recent Exhibition of the Canadian Association at Hamilton, we adverted to two points which seem worthy of farther remark—the extent with which the Mutton breeds of Sheep are bred and exhibited, and the display of Turnips and Mangolds as farm crops. The former, however, is so closely associated with the latter; the culture of Roots is so important an essential in the keeping of a good flock of sheep, and both, as we believe, are so inseparably connected with *the best farming*—that it is mainly the experience of Canadian farmers in the production of Roots, which we wish now to refer to at greater length.

We are by no means inclined, for the sake of pointing an argument, to decry the condition of our own agriculture, and unduly exaggerate what is done beyond the lines. But the President of the Association, Col. Johnson, of London, C. W., in his closing address, adduces some facts that are at least worthy of our attentive consideration. After drawing an interesting comparison between the crops of that Province and those of several of our States, he shows that great attention is there paid to a proper rotation—"wheat after wheat, or wheat after oats, and so on, being a thing of rare occurrence," while "it is certainly gratifying to witness the great increase which is rapidly being made in the growing of turnips, mangold wurtzel, beets, carrots, and other roots. I believe the growth of these roots must form the basis on which a good sound systen of husbandry must stand."

From the last census, as quoted in this address, we ascertain that in 1860 there were raised in Upper Canada—

Turnips	18,206,859	bushels.
Carrots	1,905,598	do.
Mangolds	546,971	do.
Total	20,659,528	do.

Now, as a natural consequence, the greater attention paid to rotation and the raising of roots, *increases rather than diminishes the production of grain*, at least of those kinds of grain in use mainly for human food. In the United States roots are held in so light esteem, and so little cultivated, that the national census does not even give them the honor of a place in its schedules. According to the last State census, there were grown in New York, in 1854—

Turnips	985,522	bushels.
Beets	7,884	do.
Carrots	478,277	do.
Total	1,471,683	do.

The area of improved land in Canada West, in 1860, we do not know; in 1850 it was about 3,700,000 acres, and it might have nearly doubled by 1860, and still have only been *one-half* as large as that in this State, (13,600,000 acres by the census of 1855). Now let us compare the

grain production of Canada and New York in 1860, bearing in mind that the extent of cultivated land must be at least *double* in the latter :

	State of New York. Bushels.	Upper Canada. Bushels.	Ohio. Bushels.
Wheat	8,861,099	24,640,425	23,640,356
Rye	4,786,905	973,181	1,078,764
Indian Corn	20,061,048	2,256,290	91,588,704
Oats	35,175,133	24,220,874	25,127,724
Barley	4,186,667	2,821,962	1,548,477
	73,070,852	54,812,732	142,984,025
Peas and beans	1,609,334	9,650,542	
Root crops as above	1,471,683	20,659,528	
	76,151,869	85,122,802	

With such a table as this before us, can we rest entirely contented with our present mode of farming? Can we continue to sneer at root crops as we have done in the past, when, with the same obstacles to contend against, and the same course of reasoning in equal force to oppose them, they are still doing so well for the farmers of the neighboring Province? And we can not forbear calling attention to the fact that, whatever the opposition to the introduction of root crops, when they once fairly obtain a foothold as a farm crop, they appear to grow rapidly in favor. A correspondent at Port Hope, C. W., wrote us last year, (see Country Gentleman, vol. xxi, p. 241) :

"According to the census of 1851, there were over 3,000,000 bushels of turnips grown in Upper Canada, and about 182 bushels was the average yield per acre. In the year 1861 the turnip crop had increased to over 18,000,000 bushels ; the average per acre had increased to 248 bushels. Although this is but a low average, it is a great improvement in ten years, and probably the average per acre will be doubled by the next census."

Does not this show convincingly that with practice in growing roots comes increased success in the yield obtained, just as with practice in feeding them comes an increased conviction of their value?

But there is another point to illustrate the more correct basis upon which the farming of Upper Canada is conducted. Our so-called "rotations" here not only lack root crops, but any thing else of any great importance, except clover and grass, to intersperse with the cereal grains. Indian corn, although varying in mode of culture and growth from wheat or barley, is also a cereal, and it is comparatively little change in the draft upon the soil—little actual *rotation*—to alternate one with the other. In Canada they employ the *pea* largely for a rotating crop—a plant wholly different in character from the cereals, and well suited for the purpose, while at the same time supplying an admirable food for sheep. Some of our best sheep feeders have constantly resorted to Canada (except when the price arose too high to permit it) for peas in preference to any other feed ; our home markets do not supply them—indeed, as Col. Johnson says in the address referred to, Upper Canada produces nearly three times the quantity of peas raised in all our twenty-one grain-growing States put together ! That the home market for them is tolerably good, we may infer from the fact that they are not always to be had here at a price admitting their liberal use.

Here we certainly have the elements of a more systematic and scientific culture than obtains among ourselves. The average per acre of the crops in Canada West, as reported in the census of 1861, are very creditable to the practical workings of the system ; they were, in bushels :

Fall wheat	17¼	Spring wheat	17¾
Barley	23¼	Rye	13¾
Peas	20¾	Oats	31¼
Buckwheat	16¾	Indian corn	28

And although, as Mr. President Johnson states, "there are great difficulties in the way of the adoption of the system of rotation of crops practiced in Britain, principally owing to the expense of having the usual proportions of land under drill husbandry,"—still a much nearer approach has there been made to it, and the principle on which it is founded, than is the case in any large portion of our own country.

There is but one other statement in the paper before us, to which we shall refer. Adding together the total bushels of eight principal crops, (wheat, rye, Indian corn, oats, barley, buckwheat, peas, and potatoes) Col. J. finds that

		Per head of population.	
New York produces	106,073,936 or	27¼	bushels
Pennsylvania	94,077,287	32¼	do.
Michigan	31 355,917	41¾	do.
Ohio	115,291,198	49½	do.
Canada West	78,068,685	55¾	do.

"In examining these returns, we find that no State produced as much wheat as Upper Canada.* But in the article of Indian corn, Upper Canada is decidedly below any one of these States in production; even the State of Maine, with its rigorous climate and poor soil, compared with its population, is far before us in this respect, showing that with respect to the estimation in which peas and Indian corn are held in Upper Canada and in these States, there is a very marked and striking difference; whether we or they are right in this respect may be a subject of controversy. It is, however, well understood in Canada that there is scarcely in the whole catalogue a more valuable article of produce than peas. I make this comparison in no spirit of vain exultation, but simply to show that, tried by this test, the agricultural capacity of Upper Canada exhibits a favorable comparison."

We can at least compliment our Canadian friends upon the character of the exhibit, and the Provincial Association upon the able and practical address of its retiring President.

On a previous page we mentioned that in our judgment it would be more profitable if some farmers would grow fewer crops and grow them better. We were led into this train of thought whilst making an agricultural survey of Franklin county, and have frequently mentioned it to farmers, and we are not sure, judging from subsequent conversations, that they did not feel the full force of the remark, and as a general thing inquired how to proceed to cultivate better. We suggested then that almost all the lands in the county would be benefitted by underdraining, and then explained

THE PHILOSOPHY OF DRAINING.

"The chain of life is a curious one. We have a regular and beautiful gradation from the lowest and meanest cell up to the intellectual organization of a Humboldt or a Newton. But the different degrees of life, as we may call them, not only appear thus in order, but also dependent upon each other. They are really linked together. There is no independent existence. Without adopting an hypothesis which for the present seems to be in pretty general favor, that the higher forms of life are natural

---

* In 1860 Ohio produced 153,113,341 bushels, or 65.45 per head of her population. See Ohio Agricultural Report for 1860, pages 30, 31.—Klippart.

growths out of lower, we may with perfect confidence assert that, let the germ come whence it may, the higher as a rule succeeds the lower, and is dependent upon it. Looking chiefly to the more valuable, and perhaps more permanent forms of life, we may regard the inferior as merely occupying a relationship somewhat analogous to that which the scaffolding does to the house, or indeed to the timber which enters into the structure of the house. The tree required not only to grow, but to be afterwards broken up, in order that it might be used in the building. So the earlier and lower forms of life were necessary to the subsequent and superior forms. Whilst those were growing, living, dying, they were neither growing, living, nor dying for themselves alone; they were preparing place and material for the existence of their successors. But we must not forget that whilst the inferior forms of organized beings were thus to so great an extent necessary to the existence of the superior, they were the only forms possible under the circumstances. Even if the superior forms had the raw or partially formed material ready to be used up by them, they could not have appropriated it; or even if they could have taken it up, they could not have elaborated it into their present forms. Not only so, but if the superior organisms which we now see around us, in this most advanced stage in the progress of the earth, were overtaken by a set of circumstances similar to those in which the inferior lived, the order of things would be entirely reversed. "Similar causes, in similar circumstances, produce similar effects." To produce dissimilar effects, we may change the causes and let the circumstances remain, or we may change the circumstances and let the causes remain the same. In the present circumstances, generally speaking, the superior forms of beings are enabled to subsist to a great extent not only in the place of the inferior, but upon them; and *all our true progress in agriculture is but the carrying out of this law*. We have said that, to a certain extent, the superior organisms are enabled to take the place of the past, and subsist upon the inferior. If it were not so, the agriculture of man were impossible; and if this supremacy of the superior over the inferior prevailed to the fullest extent, then agriculture by man were unnecessary. From the present point of view we may say that the agriculturist is but operating on soil, climate, and plants, to help forward in some minute details a course of amelioration, which, however slowly, is going on at any rate. The coral insect is working in its own way to form reefs, islands, and continents, and raise a surface into the dry medium of the air. When this is done, forms of life which were impossible before become actual. But if these lands are again submerged, even though the terrestrial plants be rooted there, marine plants spring up on their ruins. When, even after the separation of the land from the sea, the atmosphere was still of a dull, thick, and hazy character, impene-

trable by the rays of the sun, the superior plants of which we speak did not and could not exist; and if that state of land and atmosphere were restored, the inferior plants would obtain the ascendancy, and actually make a prey of the superior. The two classes of organized beings exist, and which has the ascendancy depends upon circumstances; which, in fact, devours or is devoured, depends upon certain now pretty well defined conditions. We have seen that the superior prey upon the inferior in proportion as the earth advances from a chaotic state; that to the extent to which the older conditions remain, the inferior preys upon the superior, just as in inferior husbandry weeds gain the mastery over the crops, but when all the conditions are observed, the crops triumph over their enemies."

These remarks may appear to have a very remote reference to the subject to which we mean to apply them. They, however, show the exact place which certain agricultural operations occupy in the great scheme of terrestrial progress, and they prepare us to understand the position which the creature, man himself, holds amid the changes through which the globe and its atmosphere are passing. In some former articles* we pointed out with sufficient clearness for the occasion how draining prepared the land both for wet and for dry seasons, how it kept up the temperature of the soil, and even that it enabled superior plants to maintain their ascendancy over inferior ones. One of the great conditions which we have noted in the progress of the globe to its present state, is one perfectly analogous to the agricultural process of draining, the elevating of the land above the sea, and the clearing of the atmosphere. Just as the operations of agriculture, when viewed with intelligence, help us to understand the great processes which are going on around us, independently of our will, so do these processes in their turn help us to assign their proper places and value to those things which experience had taught but did not explain to our fathers.

The thoroughly cultivated field or farm represents the really advanced state of the earth, in which conditions favorable to the development of the higher forms of life are established; the badly cultivated field or farm represents the other stages in the earth's progress, in which only inferior forms of plants and animals could exist. In the former, the soil by being well drained maintains its temperature, permits a certain circulation of air and moisture, and by preventing noxious exhalations from the soil, allows the vivifying rays of the sun to visit the vegetation. In this case the superior plants thrive apace, and soon turn any others which come their way into the means of subsistence. When, however, these conditions are not observed, and we have more or less of that state of things in which inferior plants only did and could exist, what wonder if, for example, the noble

* Ohio Agricultural Report for 1860, and Principles and Practice of Draining: By J. H. Klippart, 1861.

and useful plant wheat should fall a prey to the inferior and useless *smut* fungus. Just in accordance with the general law which we have dimly traced, we may place wheat in those conditions which are favorable to inferior life only, but we cannot make it thrive. In placing it so, we but give the superior as food for the inferior. We sow wheat in land which has not been sufficiently drained, and besides the other causes unfavorable to the growth of these plants, it has to struggle amid vapors from the soil, which are highly favorable to another species of plant, but the growth of which is inimical to that of the wheat. Thus it is that the parasitic plant covers up and fastens upon the wheat, not, as we now see, in the face of all known laws, but clearly in accordance with laws that have been in steady operation since the world began. In the same way we allow other land to remain close, cold, and water-logged, under an inferior species of so-called pasturage, and instead of plants rich as food for animals, we have parasites and others produced, which are not only destructive of these higher forms of vegetable life, but actually attack animals themselves.

Whether we have hit upon the exact immediate cause or not of the curious cases in which the herbage of certain fields causes the hair to fall off the animals grazing upon them, we have here most certainly the class of causes to which we have every right to trace the strange phenomenon; and that we have hit the exact cause itself is made more than probable by the fact that the herbage in those fields which may be used by animals with impunity, is that which grows upon portions of the lands which have naturally those advantages which drainage alone can give to others. The high and dry land naturally grows plants of a superior order; the low and undrained nurtures parasitic fungi, which make a prey of the superior, and in the animal economy produce effects the opposite of those for which food is intended. Here, then, is another reason for draining, showing that instead of flagging in our efforts, we should, particularly in our humid climate, follow up our past labors in this respect with increased energy."

After the lands have been underdrained, then they should be deep-plowed. Some have suggested that deep plowing did no good, but as there is a right way and a wrong way of plowing, so there is also a right time and a wrong time for deep plowing. In order that all may be benefitted by the experiences of the past, we present the following

HINTS ON DEEP PLOWING.

That deep plowing is often very beneficial to many soils, does not admit of a question among intelligent farmers. The *when* and *where* is the only point of dispute. We find in an English agricultural paper this subject discussed at some length, and think the points brought out will interest

and instruct American readers. We condense them in the two following paragraphs, and add some facts from a practical New England farmer and writer.

Deep plowing is most effectual in the autumn, exposing the soil to the influence of frost, rain, and air through the winter, which act upon the mineral ingredients of the soil, rendering them available for succeeding crops; also pulverizing the soil and thus facilitating the passage of the roots into the subsoil. As regards the period of the rotation, it should precede root crops, (or, in this country, Indian corn), or may be the first plowing for fallowing preparatory to the wheat crop. Deep plowing is most beneficial to stiff clays, and as a rule we may plow deep when the subsoil is of the same character as the surface soil if both are tenacious, or when the subsoil is composed of good clay, only requiring atmospheric influence to sweeten it.

Deep cultivation should be avoided on nearly all very light soils, and in plowing for crops after large applications of manure, thus burying it too deeply, or in turning under clover or other green crops. Deep plowing in autumn, on most clays, is equal to a half dressing of manure. Clay from which the air is excluded exhibits a dark bluish color. After draining it is not advisable to bring up more than two inches of clay subsoil at a time; otherwise more is brought up than the frost, &c., can fit for growing good crops.

The Hon. F. Holbrook, writing of the advantages of deep plowing on long cultivated soils to the New England Farmer, says: "Where the land is of a close texture, with a strong compact subsoil, it is not unusual to find a better underneath than that which has been worked so long, and so shallow on top. By breaking through this artificial hard pan or crust, and bringing up a portion of the under soil to the light of day and the influence of manure, the crops are by that operation considerably increased, even though no more than the customary quantity of manure per acre is applied. And if high manuring is practised in connection with the deeper cultivation, the crops will be very much increased over what could be realized from the old shallow plowing and artificial hard pan near the surface, accompanied by as high manuring. Then there is the difference, too, in the care of tilling the crops raised on deep, mellow land, as compared with those on hard, shallow plowed land. If deep sod-plowing is to be practiced, it is especially desirable to do it in the autumn, that the atmospheric influences may ameliorate and modify the upturned subsoil, preparatory to future cultivation.

Plow the greensward in November, say eight to nine or ten inches deep, according to the quality of the subsoil. In the spring spread a good coat

of manure, which if fine compost can be sufficiently mingled with the soil and covered by the harrow and cultivator; or if coarse, can, by lightly cross-plowing, be turned under three to four or five inches deep, according to the depth of plowing in the fall. If the plowing was, say nine inches deep, there will be no difficulty in gauging a light plow, with a sharp share and wheel on the beam, so as to cross-plow in the spring and cover the manure about four inches deep, without disturbing the sod underneath. Green manure well covered that depth will decompose readily, and be more active and effective on the succeeding corn or other hoed crop than if turned down under the sod.

An instance is given where sod land was plowed in the spring for corn, turning under the manure some six inches deep. "Nearly half the crop was destroyed by grub-worms; and the soil being of a close, compact loam, the manure under the sod was too inactive, so that the corn which did survive was backward in maturing." The next year the owner wishing to plant a piece of greensward adjoining, also infested by grubs, consulted Mr. H., who advised as above. It was plowed in November, and in the spring harrowed lightly, and then manured and cross-plowed, turning under the manure from four to five inches deep. The corn was planted in the usual manner, and produced a good crop. No traces of worms have been seen, and the soil has been very mellow, and free from grass and weeds, and easier to till every way than the piece of the previous year. The subsoil was a close, light-colored clayey loam, but by spring it had changed to several shades darker color than when first exposed to the air, and no doubt the good effects of this deep plowing will last for many years. An instance of the renovation of old worn-out plain land by deep plowing, accompanied by high manuring, is given by the same writer: "The land had for many years been under the wasting effects of shallow-plowing and severe cropping with rye, until at length it was quite exhausted and abandoned to pasturage, yielding a scanty herbage in the early part of the season, but becoming dry and sere by midsummer, and remaining so through the remainder of the year. My friend found that the surface soil was of little or no account any way, but thought there might be some hope of making productive land of the subsoil. He accordingly commenced on a piece of the tract of about five acres, by at once putting in his universal sod and subsoil plow ten inches deep, in the month of November, and turned up a subsoil of yellow loam, fine grained and free from stone, that had never before seen the day. In the spring following the plowed land was manured broadcast, at the rate of about twelve cords per acre, and cross-plowed with a sharp steel plow, turning the manure under four or five inches deep. The field was then harrowed, furrowed out in rows each way,

a tablespoonfull of superphosphate of lime put in each hill, and the piece planted with corn. It yielded about seventy bushels of shelled corn to the acre, and the next year a good crop of oats, and is now well set in grass for a mowing field. Other portions of the condemned old plain are now undergoing a similar process of deep plowing and high culture, with good results; and this desert will doubtless soon blossom as the rose." As we have remarked before, there can be no question that a deep and fertile soil will produce much the largest and best crops. There must be room for the roots to go down beyond the reach of a common drouth, and to find appropriate food for their use; and this is most largely present in a deep and mellow soil. Deep plowing and high manuring will on most soils produce profitable results, and as the present is a very favorable time for the first, we hope these broken hints and gleanings will prove of service to our readers.

After the ground has been properly prepared, great care should be taken to seed it with well selected seeds. But as every one may not know how to select seeds, especially among the cereals, we will in a few words describe the most approved manner.

In every field of grain there are to be seen ears differing in size, in form, and in general appearance from those growing beside them. Some of these can be recognized as the ears of established varieties, but a few will be distinct from any of the kinds in cultivation. Farmers usually bestow little attention on the different kinds of ears which may be sometimes seen growing in the same field, and which can be best observed during the cutting and harvesting of the crop; but if one farmer in a thousand would undertake the collection of such ears with the intention of sowing the seed, and thus propagating the kinds, the number of varieties would soon be considerably increased, and the kinds in cultivation would be improved by this selection of the best ears. Those who intend to collect ears of one or more of the cereals, should proceed methodically, not only when selecting but in keeping the ears of the apparently different kinds distinct at the time of gathering them, so that each kind can be sown by itself, and the produce from the seed of the selected ears collected and stored for future sowing. During the time of selecting ears, small bags formed of cloth should be carried, and as the ears are separated from the stalks they should be placed in one or other of the bags. Care should be exercised to prevent confusion and intermixing of the seeds. Every circumstance should be noted at the time, such as the field of grain in which the ears were gathered; the characteristic features which the ears presented when growing, such as size, form, whether the ears are close or open, the color of the chaff and straw, chaff smooth or downy, and other points deemed worthy of being recorded.

A written description should be placed with the ears put into each bag, for after reference, as it is seldom advisable to trust to the memory as to facts. The bags containing the ears should be hung in an open place, away from mice and other depredators until the period of sowing the seeds. When it has been determined that the sowing of the seeds of the selected ears shall be proceeded with, a plot of ground near the entrance of the field can be chosen, the remainder of the field to be seeded with grain of the same kind, whether wheat, barley, or oats. Small ruts can be formed by a hand hoe, the seed thinly sown, and the earth returned by a garden rake, the seed being lightly covered. Each plot seeded should be marked by a piece of wood inserted at the end of the rows, and the number marked on the wood for after reference. A note-book should be used for inserting all facts connected with the selecting of the ears, the sowing of the seed, the appearance the different plots presented at the period of brairding, tillering, earing, blooming, and ripening, with dates and other particulars.

The amount of trouble which the propagating of varieties entails renders it advisable for experimentors not to attempt too much at one time. Only those who are resolved to bestow minute attention during the whole period, from the time of selecting the ears until the quantity of grain produced admits of its being distributed, should undertake the selection of ears for propagating the varieties.

There is seldom a spring during which we do not hear farmers complain —in level regions especially—of the crops having been "*winter killed.*" Strictly speaking, there is no year in which the spring shows us the same number of apparently healthy plants in a field as there were at the commencement of winter. A portion of them always are killed, or rather die, either from the injurious influences of an inclement season, or from the improper condition of the soil—the loss by winter killing is in a greater degree due to the latter than the former cause. Everywhere the farmer is agreeably disappointed if he meets with no losses of this kind, and therefore always sows a proportionably larger amount of seed. The farmers to-day, in many regions of the State, sow from two-fifths to one-half more seed per acre than they did forty years ago for winter crops. So far as wheat, one of the great staples of the State and the main winter crop, is concerned, the amount of seed sown per acre is entirely too great. Any one may soon convince himself of this fact if he will make a little calculation of the productiveness of wheat. A head of wheat usually contains from forty to sixty grains; it follows then, as a matter of course, that if every seed sown yielded forty grains only, that a bushel sown would yield forty bushels; but the general practice is to sow a bushel and a half per acre, and harvest twenty bushels at most, but not unfrequently fifteen or

sixteen bushels only are harvested per acre. A majority of the heads composing these twenty bushels have 60 grains per head—what has become of the other grains? The general reply is "*winter killed*," "did not come up," and "eaten by the birds." Probably the reply is correct. But as Ohio sows about two millions of acres in wheat, and sows a bushel and a half per acre, if winter killing were prevented, and all the seeds came up, and the birds were obliged to seek some other food, it is evident that three pecks, or a bushel at most, would be sufficient to seed an acre, thus saving about a million of bushels in the State on the seed alone.

There is in the soil a certain amount of plant food in a condition to be appropriated by the plant. This amount of food may be increased by manures, by plowing, or otherwise preparing the seed bed, and by the action of frost, rain, wind, &c. Now, if a square foot contains plant food in a proper condition to nourish and mature in perfection twelve plants only, (but the farmer puts forty seeds on this square foot), is it not very evident that either twenty-eight of the plants must starve, or else that the entire forty will be weak and puny; much more liable to be killed by inclement weather than stout, vigorous, and healthy plants would be?

The Darwinian doctrine of the law of selection and struggle for existence is just as applicable to the vegetable kingdom as it is to the animal. The stout and vigorous plants will monopolize the food within the reach of their roots, whilst the weaker ones would be deprived of what would otherwise be their just portion. Hence they are not only more liable to be attacked by insects and fungoid diseases, but will sicken and die.

Many experiments have been made to ascertain the proper depth at which wheat should be planted or sown, and the result of every one of these experiments is decidedly adverse to deep sowing or planting. The most recent of these experiments may be found reported in "*Stockhardt's Zeitschrift fur Deutsche Landwirth*," vol. XV, No. 6, p. 192, by Dr. B. as follows: "I sowed one thousand grains of wheat in a medium soil, with the following result, viz:

Depth in inches.	No. of plants matured.	No. of heads gathered.	Depth in inches.	No of plants matured.	No. of heads gathered.
6½	50	315	2½	882	5,556
5½	113	711	2	945	5,953
5	151	951	1½	951	5,991
4½	289	1,820	1	900	5,670
4	491	2,693	½	441	2,746
3½	630	3,969	0	151	951
3	856	5,392			

This statement is defective in several very important respects. *First*, we have no precise description of the soil or preceding crops; *Second*, we have no account of the season—neither winter or spring; *Third*, the weight of the grains gathered would have been much more satisfactory than the number of heads. Yet, notwithstanding the imperfection of the statement, it is very evident that the greatest number of stalks mature and the greatest number of heads are produced when the seed is sown from one-half to two inches deep.

A case was brought before the Knox County District Court, in which the proper depth of planting wheat was involved, and we present the following account of it, as published in the *Ohio Farmer:*

DEPTH FOR COVERING WHEAT.—A case has been on trial in the Court of Common Pleas held in Mt. Vernon, Knox county, involving questions quite interesting to farmers, and I will send you for publication the substance of the most important facts elicited.

The suit was upon a contract made between the parties in 1860, by which the plaintiff claimed that the defendant had agreed to put in for him about fifty acres of wheat with a drill, and to do it in a proper manner. A portion of the ground had been in oats—had been plowed very deep, and was sowed in the early part of September; the residue was corn ground —was harrowed and drilled in without plowing, in the latter part of the month; this came up well and made a good crop. The oats ground, equally good soil, made a very poor crop, hardly worth cutting; but a very small portion of it came up.

The witnesses for the plaintiff stated that, upon examination, it was found that the seed had been deposited to the depth of from six to eight inches, and that while much of the seed germinated, very little came through the surface. Around stumps, and in stony places where the drill could not run deep, they said the crop was good.

For the plaintiff it was claimed that wheat should not be sown deeper than three inches.

One witness testified—"Where I have had wheat put in deeper than that, after it came up and formed a stool of roots at the surface of the ground, the plant between that and the seed would perish, and the power of the grain is thus exhausted and the plant would show much less vigor. I have examined and experimented until I am satisfied that this is the universal result, &c."

Another witness—"Eight years ago I made an experiment to ascertain the proper depth of sowing wheat—deposited 50 seeds at the depth of 8 inches, a like number at 7, 6, 5, 4, 3, 2, and 1 inches, and 50 grains I raked in on the surface. Of the seed deposited at 8 inches, two came up, but formed no heads. Of those deposited at 7 inches, about one-fourth came through the ground, but formed no heads. Ten of the fifty seeds planted at 5 inches made defective heads. I had a few perfect heads in the row planted 4 inches deep, but most were defective. I think all planted at 3 inches came up, but the row deposited at 2 inches was the best, *and came up sooner* than any of the rest." This witness did not state whether the ground was dry at the time he planted his seed, but I infer it must have been, or certainly the seed planted at one inch and raked in on the surface would have been the first to come up.

Another witness—"I should prefer to deposit the seed at the depth of one inch—certainly not deeper than two inches. It is a mistake to suppose that deep seeding is any security from winter-killing. The roots of the plants form at the surface, whatever may be the depth of the seed. But, from frequent examinations, I am satisfied that wheat planted not deeper than two inches will stool out better than that deposited at a greater depth—that is, will produce more plants to a grain."

For the defendant it was claimed that no contract had been made to put in the grain in a proper manner, but only as well as he knew how. It was also insisted that the wheat was not put in too deep, and most of the witnesses claimed that wheat would produce good crops at 4 inches, or even 5 or 6 inches. It was further claimed that the reason of the difference between the corn ground and that upon which the crops had failed, was to be attributed to the fact that directly after the latter was sowed a heavy shower of rain had formed a crust upon the land so hard that the wheat could not make its way through it!

The soil was described as a dry, loamy, limestone soil, of very good quality for wheat, and yet nearly all the witnesses for the defendant insisted that this crust was the cause of the failure of the crop.

From the facts elicited in this interesting investigation it appears that farmers have no established custom in regard to the proper depth of sowing wheat. Under the old system of broad-cast sowing it was the custom to put on two or two and a half bushels to the acre, which was, if plowed in, deposited at all depths from 1 inch or less to 6 or 7—if only half came up there was still enough for a fair crop. But as the drill puts in all the seed at a uniform depth, it becomes a very important matter that we should hit on a proper depth, as a mistake may lose us the whole crop. It is, perhaps, not common for the ground to be so loose as to allow the drill, whether properly adjusted or not, to run deep; and for this reason, I think farmers seldom pay much attention to the depth at which the drill is running.

At one of the agricultural schools in Germany a series of experiments were instituted and continued for a series of years, and depths stated in the table were found to be the most productive ones for the several kinds of plants and seasons.

Kind of Crop.	In heavy soil.	In ordinary wet season.	In a dry season.	In sandy soil.
	Inches.	Inches.	Inches.	Inches.
Wheat	¾	1½	2	2½
Rye	¾	1½	2	2½
Oats	¾	1½	2	2½
Barley	¾	1½	2	2½
Peas	1	2	2½	3
Beans	1	2	2½	3
Buckwheat	1	1½	2	3
Vetches	1	1½	2	3
Acorns	1	1½	2	3

It must be evident to every one that crops put in at a uniform depth will grow and ripen more evenly than if put in at irregular depths; hence there is every reason, of a theoretical kind, at least, why wheat crops drilled in should always be better than those put in broad-cast; and yet the contrary, no doubt, is sometimes true in practice, for the following reason, viz: One-half of the wheat in broad-cast sowing falls too deep to germinate, and leaves all the plant food to the germinating half, which latter then, having the normal amount of food, light and heat, matures in perfection, although unevenly. Hence we find many instances of farmers

abandoning drills and returning to broad-cast sowing. The fault is not in drilling, but because they put in too much seed.

If the seeds sown are perfect in every respect, are sown not too thickly, and at a proper depth, on a well-prepared soil, which has been under-drained, or has surface drainage furrows sufficiently close to each other to admit of complete surface drainage of all superabundant water, and sown in good season, the plants then will be healthy and vigorous, and one will be surprised to see the resistance they will be able to make against insects, vegetable parasites, the effects of inclement weather, or, in other words, against "*winter-killing.*"

Thousands of bushels of seed are undoubtedly annually sown which might have been sold in market, but will not germinate, or if they do germinate, produce sickly plants.

The fields selected for wheat should have an exposure ranging from east to south; those fields having a west or north exposure, everything else being equal, do not yield as satisfactory crops as those having an eastern or southern exposure. Fields having a northern or western exposure are more liable to remain wet, freeze harder and deeper; the snow lies longer on them, and throughout the year are cooler and wetter than others. The best time for seeding wheat in Ohio is, as a general thing, from the first to the twentieth of September. Should the autumn prove favorable, and there be a large growth of foliage on the wheat plant, it will be a great benefit, instead of an injury, to turn a flock of sheep on such a field. Care should be taken to keep the sheep in constant motion, and not permit them to eat the plants off at the crown or where the root commences to form. A luxurious growth of leaves in the autumn indicates vigorous, healthy and active roots, and if the leaves are eaten off by sheep (whose bodies are light and their weight does not pack the soil) then *tillering* or stooling will commence earlier, the entire crop will be thriftier, and ripen more evenly in harvest. Besides, the droppings from the sheep are the best manure for wheat at the farmers' command. In many parts of Europe a harrow is passed over the growing wheat in spring time, and always with marked benefit; but it seems to us that if the wheat is drilled in, and then in spring time some implement narrower than the usual corn cultivator tooth passed between the drills would be much more efficacious than the use of the harrow.

The great point to be secured is ample drainage, both of the surface and under-drains. We have, in Ohio, an average rain fall of about *forty* inches; of this we have about twelve inches in the spring and nine during the summer months. Ample drainage is required to remove the surplus water in the spring, and, alternating with this amount of rain, are severe droughts,

extending not unfrequently over a period of forty to sixty days. If the grounds are well and deeply plowed the plants suffer comparatively little from drought, and if well drained they suffer very little from the excessive moisture. In periods of either drought or moisture they do not suffer only in vigor and healthy growth, but are more liable to be attacked by fungoid or parasitic growths, which are a species of cellular plants low in the scale of organization, which fix themselves upon other plants and upon their sap or juices. The recent extensive introduction of the microscope among scientific men devoted to agricultural investigations have within a few years brought to light the nature of many of these parasites. On page 450 of this volume will be found a very able article on this subject, relative to the apple, peach and pear blight, by Prof. J. H. Salisbury. Vegetable physiologists are everywhere engaged in these and similar investigations, and their researches and labors throw much light on plant life, by which the intelligent agriculturist may be much benefitted. These investigations have resulted in ascertaining the cause of the potato disease, the disease of the vine, and the silk worm. The task of discovering the cause and remedy of these plant diseases was at first assigned to chemistry; but chemistry was devoting its attention to the ultimate constituents of organic bodies, and not to the vital functions of plants, and, as a matter of course, failed in discovering anything other than the change which had taken place in the organic bodies. But the microscopists were investigating cell structures, "primordial utricles," and embryotic forms, and by these means discovered the causes of those diseases.

Rust, blight, bunt, smut and ergot, or "*spurred rye*," are specimens of these parasitic *fungi*, and seldom attack vigorous and healthy plants, any more than lice attack healthy and well-fed cattle. That farmer's cattle which are well fed, well housed, and in perfect health, seldom are "*lousy*," while those that are left to shift for themselves, are ill-fed or half-starved, and not sheltered, are almost sure to be "lousy." Just so with plants; those grown in a properly prepared soil, sown in good season, and from choice seed, will seldom be attacked by disease; whilst those, on the other hand, sown in a wet, stiff, or improperly drained soil, sown late in the season, and of indifferent or defective seed, will be just as sure, sooner or later, to be attacked by the fungi, as that an ill-cared for calf will get lousy or an ill-fed and managed colt will get *mangy*. It is, therefore, much better to allow a field to lie fallow than endeaver to force it to bear a crop for which it is unsuited, both in its position or lay, and structure and character of soil. That farmer will always be successful, other things being equal, who carefully selects his fields and cultivates them properly in such crops as they are best adapted to grow.

We have alluded to the importance of fully understanding the production of varieties, and in order to present this matter more fully and clearly a few pages will be devoted to

THE HYBRIDIZATION OF PLANTS AND ITS IMPORTANCE IN AGRICULTURE.

Few processes in the organic world are as interesting to the attentive observer as the impregnation of plants by which they are enabled to multiply in the natural way. A knowledge of this physiological process must be of the greatest importance to the intelligent farmer, because he will obtain, by a repetition of this process, seeds endowed with full power of reproduction.

That impregnation is one of the chief processes in the household of plants was known before the days of Linnæus, and this great physiologist himself based his artificial sexual system upon the impregnating and sexual organs of plants. In his work, "*Sponsalia Plantarum*," the first were thorough researches and facts, by which he proves the existence of the sexes of plants, are fully stated, and he delineates a theory of impregnation; but the botanists of more recent times reject the existence of a male and female sex as imaginary, and assert that the sexes in plants have, at most, a very slight semblance to those in animal life. After Linnæus, all prominent botanists have entered upon this field of investigation, and more especially in our own times we owe many interesting revelations to the researches of that eminent physiologist, Schleiden.

Before proceeding with the subject of hybridization, it may be necessary briefly to explain to the reader the organs of propagation and the process of impregnation among plants, this not being the proper place for giving a complete organology of plants.

The flower, bloom or blossom of any plant is a combination of the impregnating organs, and their capsules.

The capsules consist of the calyx and the coralla, and are a part of the blossom not essentially necessary for impregnation; but they seem only to be destined to protect the proper fructifying organs.

The impregnating organs consist of:

a, the anther; *b*, the pistil or style, as support of the stigma; and *c*, the receptacle.

The stamen is again divided into three parts: 1, the stamen, as support of the (2) anther, which contains (3) the pollen. (See Report for 1861, page 224.)

The stamen is generally of a cylindrical shape, bears at its upper extremity the anther, which is generally divided into two receptacles, which bursts at the maturity of the pollen and strews it upon the pistil. The pollen consist of very small corpuscles, generally of a round form, which contain,

within a cover of two membranes, an oily moisture mixed with granules—the *fovilla*. Because these corpuscles are so very small is the reason why the theory of fructification is as yet unexplained in many respects; for it requires a microscope magnifying three hundred times to distinguish the granules floating in the *fovilla*.

The form and the surface of the granules of the pollen varies very much; sometimes they are smooth, sometimes papillary or streaky. The reason why hybridization between many plants similar in their exterior form and shape is difficult we may infer that the form of the pollen is of greater importance than has generally been supposed, and that the form of the pollen must be proportionate to that of the glands and pores of the pistil in order to secure fructification.

At maturity the pollen falls upon the stigma of the pistil, covered with a viscid moisture, whose office it is to retain the pollen, and to cause the bursting of the first exterior membrane of the pollen, by causing it to swell. Then the second membrane containing the *fovilla* expands more and more, and penetrates, in the form of a tube, between the protuberances through the pores of the pistil into the ovary, where it then effects the fructification of the embryo ovules already formed there.

Fructification is not always so readily accomplished in plants; the stamen and pistil are not always in close or convenient proximity; and here, in the apparently lifeless vegetable world, we are astonished by phenomena which surprise the layman, and almost make the observer believe in a voluntary motion of plants.

Thus, in some plants anthers are remote from the pistil, and the pollen would be uselessly disseminated, but in such cases the anther itself approaches the pistil, strews its pollen upon it, and after fructification withdraws to its old place, as is the case with flax, the potato and tobacco plant. In other plants the anthers are longer than the pistil, and then they bend down to it at the proper period for fructification; sometimes they stand lower than the pistil, and then the pistil bends down to them to receive the pollen. In rye the anthers hang down over the pistil. The coniferous trees are monœcia, i. e., plants having distinct male and female flowers on the same individual. The male flowers on the higher branches drop their abundance of pollen upon the lower flowers, and so the process of fructification goes on from the lowest branch to the top. Other plants bear the male and female organs upon separate individuals, as, for instance, the willows, hop and hemp plants; in their case the wind and insects act as mediators, and often carry the pollen a great distance to the female plant. In all cases of plants the stamen represents the male and the pistil the female sex.

This is a general delineation of the process of fructification, but, as may be seen from the instances mentioned above, it is, in the innumerable varieties of vegetable forms, subject to various modifications, which depend mostly on the shape of the fructifying organs.

Now, when the pistil of a plant has been impregnated with the pollen of the same kind of plants, the seed originating from this impregnation will produce an individual identical to the parent plants.

The knowledge of this law of nature and chance, which latter often has effected great things, induced man to imitate nature in this respect, as has been done with the date-palm in Africa centuries ago, and is still done at present; for as this palm has, like our willow, the sexes on separate trees, the natives often carry the male anthers a distance of many miles to impregnate their female trees artificially.

Here, as in several other cases, it is done merely to secure the fruitfulness of the one or the other individual plant, and it was practiced long since; but the art of producing a new species by crossing two kinds or varieties is of very modern origin.

Hybridization is practiced most extensively in modern horticulture; every body is aware of the innumerable varieties of roses, pelargonias, dahlias, and of most fancy flowers; to enumerate them would be a most difficult task; their number is legion, and it is still increasing every day. All these splendid shades of color have been produced by hybridization.

Every reader knows the pansy (*viola tricolor*) of our gardens, but in the parent plants, (the blue *Altai violet*), (*viola altaica*), and the field violet (*viola arvensis*), from the mutual fructification of which this hybrid originated the splendor of colors, by which their offspring is distinguished and adorns our gardens, may hardly be supposed to exist.

We might name thousands of instances in which hybridizations have been successful in horticulture, and they still increase in number from day to day; for horticulturists are insatiate in their demands upon the beauty of many plants.

Whenever Agriculture went to school to Horticulture, it has always learned something useful, and there is no better school for the progressive husbandman than the garden. Modern agriculture, aiming at a garden-like culture of the field as its highest ideal, confirms the truth of this principle.

Many a practical agriculturist may perhaps reply that hybridization may be well enough as an amusing sport for the florist, but would not do for his serious vocation. Such an objection would not be well founded; for as the florist adds by this means to the splendor of colors in his varieties of plants, and gives a more pleasing form to the structure of the plant and the flower,

so the agriculturist should make the improvement of the plants cultivated by him the object of his endeavors. He will do it, in all probability, in a manner different from that pursued by the florist, who aims merely at a change in the exterior appearance of the plant: he will produce hybrids which will yield a larger amount of useful substances; he will be able to lengthen or shorten, at his option, the period of vegetation of many plants; he may make them as insensible of injurious influences as the form of the seed was; he may establish the excellencies of the one parent of the plant, and entirely remove the defects of another parent, or at least be able to modify them; and all this he may effect much easier and safer by hybridization than by any other means in the culture of plants, such as acclimatization and more careful treatment. That all this is possible can be proved by a multitude of successful hybridizations effected by horticulturists and pomologists, if we had space to enumerate them all. In the animal kingdom we find many hybrids, of which the mule, as a cross between the horse and the ass, is the most common. Besides the accidental crosses between different species of animals, which often produced the most abnormal animal forms, or perhaps better, deformities, the innumerable varieties of the dog furnish striking instances of crossing. The practical husbandman, as breeder of domestic animals, also resorts to crosses between horses, cattle, and sheep, to accomplish his ends. The English—who might be our protótypes in the hybridization of plants—have shown how highly the races of cattle may be improved by a judicious and consistent system of crossing.

The natural systems of the vegetable kingdom established by Jussieu and De Candolle, give the most reliable information on the affimity of plants. The knowledge of either of these systems is very important to the experimentor, for he may not hope to be successful in his experiments unless he adheres strictly to the rule of selecting only such individuals for crossing as have the nearest resemblance to each other in their organisms. To expect to produce a cross between conifers and deciduous plants in which the characteristics of both are combined would be folly, and it would be still more absurd if one would hope to produce a hybrid by crossing a corn plant upon a potato—having potato bulbs instead of roots, and corn ears at the head.

Hybridization can be successful only between closely related varieties of a family, as they are grouped in the natural system. As an instance, the family of the *solanacœ* may be mentioned here. It has, except in the polar regions, its representatives in every zone, and to it belongs the potato (*solanum tuberosum*), the most important member of this family. Its more distant relations are the known varieties of henbane (*hyoscyamus*), tobacco

(*nicotiana*), Jamestown weed (*datura*), Spanish pepper (*capsicum*), and others, each of which possesses its specific kinds and varieties. Thus the potato (*solanum tuberosum*), has for its next relation the *solanum nigrum* (common nightshade), and *solanum melangœna* (egg plant), which we know, and these three vegetable forms are named kinds of the same family. The existing varieties of the potato, tobacco, and Guinea (Spanish) pepper, plants which are distinct from each other partly by the form and color of their leaves, or their bloom, partly by the time of maturity, are designated by the term *varieties*. A correct idea of the division into families, species, kinds, and varieties, is important for hybridization, because experience shows that a cross between varieties is readily accomplished, between individual kinds more difficult, and between distinct species very difficult, if not entirely impossible.

In the family named above, several attempts at hybridization have been made. Thus Klotzsch crossed the *solanum tuberosum* (potato), with the *solanum utile*, a kindred variety from Mexico, wherefrom a hybrid resulted, which he baptised the sugar potato, but which, in spite of all commendation, does not promise to become a very valuable acquisition to agriculture, since the luxuriant entangled growth of the vines renders the cultivation of the field difficult, and its flat sweetish taste is unpalatable. As to its value for fodder and technical uses, we are not informed.

Professor John Lindley, in speaking of hybrids between the bean and pea, and the kale and horseradish, mentions also a hybrid between the Jamestown weed and tobacco plant.

Two individuals are necessary for hybridization, namely, a male plant, from which the pollen is taken, and a female plant, upon which the pollen from the male is strewed, and the office of the latter is to bring the seed for the new hybrid to maturity. The two parent plants must be selected with the greatest care and precaution, and the end to be attained by hybridization must be consistently pursued.

Lecoq* has made many experiments with hybridization; has observed that the majority of hybrids produced by crossing always resembled the mother plant more nearly than the male plant, although they possessed the *characteristics* of the male plant. This view of Lecoq has been adopted by the English writer, Knight, and his countryman, Herbert, even, has found that in general, yet not without exceptions, the male plant exerts more influence upon the foliage, and the female plant upon the flower and seed. According to these principles, a proper selection is difficult to make.

*De la Fecondation Naturelle et Artificielle des Vegetaux et de l'hybridization considérée dans ses rapports avec l'horticulture, l'agriculture et la sylviculture, contenant les moyens pratiques d'opérer l'hybridization et de creer facilement des varietes nouvelles.—Par Henri Lecoq, Paris, 1862.

Suppose one possesses a certain kind, A, bearing fruit which is of early maturity, but inferior quality, and wishes to preserve its early maturity and to improve its quality. For this purpose he must select another kind, B, bearing fruit of the desired quality and as nearly as possible of the same early maturity. A should be the mother plant and B the male plant; or, in order to be sure of success, a second simultaneous experiment may be made with two other flowers or samples, in which A is the male plant and B the mother plant. From these crosses, individuals will result which will differ from the parent forms, and show signs of an amalgamation of the characteristics of both. If the desired improvement is not attained in the first generation, then he must select two samples from among these hybrids which approximate nearest the qualities desired, and he must proceed with them in the same way as with their parents, A and B, and so on, in a third or fourth generation, until the desired qualities are obtained.

For introductory and instructive experiments, the Indian corn plant may be used; for there are few plants which will hybridize as easily as this does. It will suffice to raise two plants beside each other, but the seed of the earlier blooming and ripening kind must be planted so much later than the later blooming kind, as to make them bloom at the same time. Then, if the two male plants bloom at the same time, they will impregnate each other with their abundant pollen, and in the next generation plants will be produced which will differ from their parents in the time of maturity. But every plant will not be impregnated by strange pollen and its own at the same time as easily as corn. On the contrary, every plant shows a decided preference to being fructified only by its own peculiar pollen; and this fact may be explained, why often an invisible atom of its own pollen suffices for natural impregnation, while for an artificial impregnation a larger amount of strange pollen is required, and this under the most favorable circumstances.

Therefore, in order to insure success in hybridization, the pistil must be protected from the influence of its own as well as of the strange pollen, which is done in various ways—by a timely removal of the anthers from the mother plant; by enveloping the flower, and thus keeping off pollen of its own variety, carried to it by the wind and insects; or by raising the plant at an isolated place, distant from kindred plants. The anthers must be removed at the right time, i. e., before the pollen is ripe and the anther walls are ruptured. All families, and many individual kinds, are different in this respect. In many, the anthers are ruptured before the unfolding of the flower anthemis, or burst during the opening; in others, they come to maturity during the period of blooming.

A careful observer will not miss the right time; but to make it easier and safer, Lecoq's excellent work is cheerfully recommended.† Lecoq has instituted experiments with nearly all families of *phānerogamœ*, and explained the anthemis in a thorough and most intelligent manner. This work is *indispensable* to every one who takes an interest in hybridization, and wishes to make experiments. His clear and popular style is understood even by the layman; and there is no other work which treats on this subject in the same plain and scientific way.

After the removal of the anthers, the pollen of the male plant is strewed on the stigma. This is done at the warm, sunny noontime, when the pistil appears covered with a glutinous moisture. The pollen is placed upon the moist pistil by means of a small brush, or camel hair pencil, and the hybridized flower is instantly covered with a gummed gauze, or better, with a glass bell. The glass bell is fixed in the following manner: On a post in the ground, reaching up to the hybridized bloom, a small board is fastened, which has a hole in the middle, through which the twig is drawn, and besides has holes covered with moss to admit fresh air. But if the plant can be placed in a tub or pot, at an isolated place, protected from the influence of strange pollen, the two arrangements named above are unnecessary. Then, if an expansion of the ovary is observed, the impregnation has been successful; and after the removal of all contrivances, the plant is left to itself for further development and maturing the seed. These operations are very simple, but they must be made with care and precaution. The anthers must be removed with great caution, to prevent the bursting of the little sacs, and to avoid any lesion of the pistil. The same caution is necessary, if the calyx is to be slit open in order to remove the anthers maturing before the anthemis. If the pistil does not appear to be covered with a sufficient amount of the glutinous moisture to retain the pollen and to make it burst afterwards, it is advisable to spread, with another small brush, a little juice from the nectary of the same, or another kindred plant, lightly upon the pistil.

Another remarkable property of the pollen, which, in many cases, is very desirable for hybridization, is that it often retains, for a long while, its impregnating power. This is the case with the hemp and corn plant, whose pollen retains its power of impregnation for a whole year, so that it may be preserved and sent to distant places. This property of the pollen is important, if one wishes to use the pollen of an earlier blooming kind for impregnating a later blooming kind.

†There are no copies of it in the English language.

Finally, it may be well to mention that hybrids cross very readily with one another; therefore, success is tolerably certain if two true hybrids are crossed on each other.

The tools necessary for hybridization are as simple as the operations themselves. Small pincers, several small brushes, a pen-knife, several small boxes, in which the pollen is preserved, are all the instruments necessary in these experiments.

The thinking, unbiased husbandman may see at once how useful and advantageous hybridization may be made in agriculture. That the farmer now-a-days claims more cultivated plants than formerly, and always desires better kinds, is proved by the constant importations and commendations of foreign kinds of grain and other plants. These exotics, when they are cultivated here, will often lose their good properties, some even in the first generation, and degenerate more and more in subsequent generations, until, at last, they are much inferior to our native kinds. The causes of this are easily explained; for in most cases these plants have neither the climate, soil, nor other favorable conditions of their native country, on which their good qualities often depend. Thus the English varieties of wheat, and the turnips, will never be fully acclimatized here, because they cannot enjoy the moist, mild atmosphere of England. To try the acclimatization or disacclimatization of such kinds of crops, without any sure prospect of success, would require too much patience and perseverance to recommend it to the practical farmer. If it can be done successfully, it will be accomplished much surer and quicker by hybridization. Any excellent kind of foreign plants, found under more favorable climatic conditions, if crossed with a kind already accustomed to our soil and climate, would doubtless produce hybrids, some of which would possess the excellencies of the former combined with the constancy of the latter; and if hybridization be continued through several generations, the end desired would at last be accomplished.

In some families, especially of the *gramineæ*, (grass families,) crosses may be affected in a more simple and empyric way, namely, by sowing the seeds of several varieties of one species mixed together. Among them will be found seeds of those kinds whose properties the farmer wishes to combine or to modify. In the first crop some individuals probably will impregnate each other mutually, and in the next year the equally mixed seed of the whole crop is sown again. From among these plants some individuals are selected which differ most from the others and approximate the type desired; and thus hybridization is continued through several generations, until the end is accomplished. Nature herself, doubtless,

produces a multitude of such hybrids, but they are lost again, because they remain unnoticed.

Not only the cereal plants, but also all other fodder and bulbous plants, and those raised for manufacturing or commercial purposes, may be improved in this way.

The pomologist finds in hybridization not only the means of multiplying, but also of improving his varieties in the true sense of the term.

The art of hybridization is too recent to expect great results from it already; it is still a dark chapter in vegetable physiology, upon which light is yet to be shed by many, very many through-going experiments. Certain rules have, as yet, not been established; when it was supposed in one case to have discovered the laws of nature, it was found to fail in another.

Among practical men, the farmers should, next to the gardeners, feel it to be their calling to institute experiments and collate the results, which would finally reveal the laws of nature governing hybridization.

Why should the husbandman not find leisure and have a desire for experiments which will make him better acquainted with vegetable life, so ingenious and interesting, and show him what formerly seemed to be lifeless in a new and peculiar light? What delight could be purer and more pleasing than to call one's self, after some successful experiment, the creator of a new useful plant?

Agricultural societies should make it an object to institute experiments of hybridization, because some of them have means at their command which the individual husbandman does not possess.

Many, otherwise very intelligent farmers, have relied upon an analysis of soils, to indicate to them the reason why their fields did not produce better crops, when their own good sense should have taught them that the *mechanical* condition of the soil was the cause of their short and inferior crops. Chemistry could render them no assistance, for the reason stated on a previous page, that chemistry was not investigating the causes of vitality or the surrounding relations of vital functions, but was simply dealing with isolated combinations, both in the organic and inorganic world.

I. *Chemistry* consists in the knowledge and investigation of elementary matter and its combinations, as well as in the investigation of the manner in which these combinations are produced. The general principle upon which chemistry is based, and, consequently, agricultural as well as technological chemistry, is this: Substances are not created anew; wherever we find such as did not previously exist, we need only to reflect a moment to know that they have been produced by the combination or separation of other materials. Agriculture consists essentially in producing materials of a certain quality in the greatest possible quantity with the least possible

expense of either money or time. This production of materials does not, therefore, consist in a *creation*, but merely a transformation and re-combination of materials already existing. The materials at hand in the soil and air are, by the process of vegetation, led into the desired combinations.

The science of agriculture treats of three things: 1st. Of the *materials to be used*, viz: the substances existing in soil and air; 2d. Of the *materials already used*, and the new form of those substances, i. e., the crop; 3d. Of the *manner in which that material is employed so as to produce new substances*, i. e., the manner in which the crop is produced from the elements of soil and air by means of the plant.

Chemistry alone cannot solve this problem. If the chemist compares the elements of the soil and air with the substances elaborated from them by the crop, he may, indeed, say, according to the laws of chemistry: "This or that substance or element is wanting in the crop or exists in too small a quantity." He may, furthermore, say: "If this is to be avoided, such and such a substance or element must be at hand in larger quantity in the soil or in the air;" i. e., he may present an analysis of the crop and state which substances must be added to soil as manure. He may, moreover, demonstrate by successive analysis at what time each substance is received into the plant and when manuring can most profitably be applied. He may, in addition, state in which form the manure must be used so that the plant may assimilate or elaborate them. From these statements of the chemist, finally, valuable rules may be derived for the cultivation of the soil. Thus far agricultural chemistry has progressed. When the general chemistry of organic combinations will have been farther developed, when we know how starch, sugar, albumen, etc., have been gradually formed by means of combination of elements, agricultural chemistry will afford us much greater results. Then only will this problem be solved, when we know the manner *in which every single substance of the crop is formed from the materials of soil and air under co-operation of the materials of seed.*

II. How can we, then, ascertain in what manner the substances of the *crops* are produced from the materials of the *soil* and *air*, under the influence of the materials in the *seed?* Agricultural chemistry heretofore could only compare the crops with the soil and air; it was compelled to leave the third point in the great problem as an unknown quantity; there is a great chasm there; we compare the beginning with the end, we know the A and the Z, but lying before them there is an immense alphabet unknown to us, viz.: the ratio of the substances absorbed by the plant within the plant.

III. Why may we not expect an exploration of this terra incognita and a filling up of that chasm, a complete *knowledge of plant-life* from chemistry alone? Why can it not answer all questions put to this science by the

farmer? A complete answer would be too long, and we must be content with brief hints on the principal subject:

a. The process of vegetation is one of incessant changes, that of the germ differing from that of the blooming plant. The phases of plant-life change every hour. An exact chemical knowledge of the process of vegetation could be obtained only by a series of investigations of every cultivated plant, so that the changes of at least every day in the life of the plant would be known. Such an investigation would require not only tens, but hundreds of years.

b. Because we do not know the ultimate extent, the external influences of light, humidity, warmth, electricity, etc., upon the substances contained in the organism.

c. We are really not sure that the process of vegetation is, in fact, any thing, other than a series of chemical processes. We know that different plants are produced from different seeds on the same field, and with the same manure. Each seed contains a specific peculiarity which it retains and propagates. It is not probable that these peculiarities should be merely chemical.

d. It is a fact that the process of vegetation is at the same time and above all a process of formation. The form of the plant is the effect of its life, and also the cause of its further existence; in a word, the plant is an organism, i. e., it forms by its own vitality the means of its further life. The forms assumed by the substances under the influence of vegetation are not merely a conseqence of their chemical proceeding; for these materials are outside the plant, not capable of assuming such forms. Hence follows, that,

e. The process of formation of plants is a manifestation of vitality not yet reduced to chemical laws.

From all this results the important principle: the substances present in the plant originate, indeed, according to chemical laws, but the latter *depend at the same time upon the pyksiological structure of the plant, the form of its root, stem and leaves.* Who would, then, exact from chemistry, a science at best beset with so many difficulties that it should every where take into consideration also the anatomical structure and exterior form; it can do so only when assisted by anatomy and physiology.

It will now be obvious why the *physiology of plants* must aid chemistry to obtain such a knowledge of plant-life as will render agriculture an industrial department founded upon science. Agriculture requires a *complete* knowledge of plant-life; but this latter is at once both a chemical and a physiological process. In this matter they must operate reciprocally. If the chemist is to be enabled to state at any time the chemical proceedings

in the plant, he must be assisted by the physiologist, who teaches him the form of the substances examined, the form of the organs constituting those substances, the position of substances in the plant, and finally, the general function of each organ. For *physiology* is the science whose object is to ascertain in this branch of it (1), the origin of the plant-organs (2), their functions in the life of the plant, and (3), the relation of these organs to the external powers of nature; its province is to consider closely, also, the specific qualities of each plant. Chemistry can not do this to the same extent; for the specific qualities appear rather in the external and internal form than in the chemical composition, and the crop depends in many cases entirely upon the specific qualities of a plant-species. The length of roots, their covering, the heighth of stem, the growth of the whole plant —all these points are important as to good crops. But here the chemist can be of no service, for, simple as the structure of the plant appears, it is nevertheless difficult for chemistry to consider it in its relation to the life of the plant; for this is physiology. If the chemist examines a plant, he is obliged to cut, pound and bruise it; the substances found by him in the plant are sometimes already in a solved condition, sometimes insolved; but the chemist can not ascertain that. A glance into the microscope, however, affords the practiced eye perfect security in a few minutes. Substances appearing in very small quantity and in a transitory manner will probably not attract the attention of the chemist, while a microscopic investigation proves that the position and manner in which the substances are contained in the plant assign to it an unexpected importance.

IV. Has *physiology of plants* been developed so far as to be of material service as a practical science? We answer, emphatically, in the affirmative. There is, it is true, as yet no work on physiology of plants that brings the physiological questions in direct connection with the requirements of agriculture. But whoever knows the standing of the present physiology of plants will admit that the methods of observation are not less exact than those of chemistry; that there is a general knowledge of the external and internal structure of plants, which would lead to many practical conclusions and applications, if they were applied in this particular sense.

The physiology of plants does not appear, in its present condition, to have much bearing on practical life, its object having heretofore been to find general laws of plant-life; isolated facts were of a value only in such a degree as they aided in establishing general laws. What could have induced botanists to care for a practical realization of their studies, since practice, indifferently understanding its own advantages, did not solicit the assistance of the science of plants? In looking over the works of agricul-

tural botany, one is forcibly struck by the circumstance that they are at least some twenty years behind the status acquired by physiology. If we consider what physiology of plants has done in twenty years, or during that very epoch in which chemistry began to rank itself among the agricultural sciences, we must award to it a capacity of development and a strictness of observation, which is granted only to purely physical doctrines.

And if we ask who did all this, we meet with names of such men only as were not occupied in practical agriculture or horticulture. It was the pure desire for knowledge on the part of a few men, living mostly in wretched poverty, that has developed the science of physiology of plants; there were a few that only resolved to promote this science, since neither public nor private positions, or salaries, could induce others to engage in this work. But the nature of science claims acknowledgment of merit, or else talent will be paralyzed; and it is especially the series of natural sciences which require money and material wherewith to promote them. While everything else in the whole world may be purchased, the most precious thing—knowledge—is claimed as a gratuity. One thing must not be overlooked: practice requires definitively circumscribed principles, and no such general laws of plant life as the botanist theoretically endeavors to establish; it needs, rather, positive answers to positive questions, which are ultimately nothing else than questions of money. In order to answer such questions, a general theoretical knowledge is the first condition; for this reason professional physiologists only will be competent for the task. But another and essential condition is this: the physiologists must be enabled to cultivate their science in all its minutiæ, so as to adapt it for actual practice. The demands of the latter, differ materially from those of science. Science demands truth, and the most general truths; practice is in quest of gain, and truth is to assist it to obtain this gain; practice expects and demands gain from relations altogether special, from a positive capital; it must, therefore, grant to science the means for investigating these relations. It matters very little to the theoretical physiologist whether this or that species of wheat contains ½ per cent. of gum; but this becomes a vital question to the practical physiologist. He will devote the greatest attention to a phenomenon that seems to be very inferior to the theoretical physiologist.

V. He who does not devote attention to science proper, imagines that the answering of scientific questions is a very simple matter. First, because everything is, in nature, connected with everything else, and especially as the very slightest circumstances are often, in practice, of great importance, it is impossible for uninitiated men to conceive an idea of the difficulties so often connected with answering questions. If, therefore,

physiology is to serve agriculture, the means must be procured for the physiologist to engage himself exclusively with practical questions; sufficient time must be allowed to him to investigate such questions with scientific accuracy, and to accustom himself to the methods of practice, in the same manner as means and time have been afforded to the chemist to devote himself wholly to his practice.

VI. The object of an agricultural physiologist is to aim at that which coincides with that of the agricultural chemist. Both are to find the means of obtaining a profitable crop under given circumstances, and of aiding the circumstances offered by nature, in order to prevent the crops from becoming a prey to accident, temperature and soil. But each one of these must do this in his own way: the chemist, according to the principles of chemistry, while the physiologist must bring the physical effects in that connection with the process of formation and the structure of cultivated plants, which may lead to answer practical questions.

VII. It may be asked, why practice has as yet furnished so few available *experiences*, and how it happens that after a repetition of the same experiments during thousands of years—for every seeding is an experiment—the practical men have made such limited penetration into the inner working of plant-life? The chemist will answer: Because the scale has never been used, and because the crops have not been specified and weighed, nor the kinds of soil been analyzed, etc. That is perfectly correct, as far as it goes; but pomologists do neither weigh their crops nor analyze their manure, and, nevertheless, pomology is based on a system of theoretical principles almost annihilating the effects of accidents. The pomologist has not only quality but also quantity of crops so much in his power, that if he perceives a tree bearing little and poor fruit, he does not attribute it to weather, or soil, or accident, but to the gardener having charge of the tree. In fact, *scientific pomology* is sufficiently far advanced to obtain the results desired, under almost all circumstances. A similar great improvement may be found in other parts of *gardening*, which, strictly speaking, is to be considered as simply practical physiology of plants. Why could not thus much be attained in agriculture? But this requires the capacity of close observation of good combination; which (capacity) can only be acquired by the naturalist, and with much labor. In order to conceive a crop as the result of temperature, soil and sowing; in short, in order to find out the causes of crop, it does not suffice to till a field so and so many years, and to observe all the statements of the forefathers; it requires a naturalist, i. e., a practiced observer; and not everybody has the capacity for this work. If old practitioners, in opposition to science, appeal to their experience, let them prove, in the first place, their capacity for observa-

tion; *for the value of experience does not consist in the number of observed cases, but in the capability of finding from them the causes and connections; and this is only obtained by talent, in connection with multifarious preparatory studies.* Taken all together, this statement will show that practice certainly may find and adopt rules, but that it has not yet and could not have brought about a science of agriculture. If the practitioner happens to be a talented observer, he may, indeed, derive new principles from his experiences, but he will follow them instinctively, without being able to impart to them the character of scientific and generally valid principles; just as Liebeg demonstrates that many well educated agriculturists do not understand the action of manures. Liebig says:

No one will maintain that it is a matter of indifference to the husbandman whether the ideas or principles which guide him in his operations are true or false. The success of his practice is evidently based on two things—that he knows what he is doing, and that he does the right thing in the right way; so that, as every scientific view in agricultural matters becomes in its application a money question, it may be of interest to him to learn the exact state of our knowledge respecting the principles and theory of manuring.

Science has taught us that plants require for their normal growth a number of elements (carbon, phosphorus, silica, ammonia, potash, lime, magnesia, &c.), most of which are furnished by the soil; and it has been established by the direct experiments of Stohman and Knak, that these various nutritive substances possess an equal nutritive value—that is to say, that all must exist together and work together in the building up of the vegetable fabric in its normal condition. Taking the case of those plants which supply food for man or beast, it is found that in the process of their nutrition, none of these different substances can replace or discharge the functions of another; so that, if one be wanting, although there may be an abundance of the rest in the soil, the plant cannot grow; if one of them be insufficiently represented in the soil, the harvest will suffer in a certain proportion to the element that is wanting; ammonia, therefore, possessing no higher nourishing or manure-value than lime, phosphoric acid no higher value than potash, &c. This doctrine, based on natural laws, is not generally admitted by English farmers, and has even been stated to be inapplicable to English soils. Starting from the result of a number of experiments made on a small piece of ground, a manufacturer of manure in London maintains, that there are degrees in the value of each of the nutritious elements, in a manure which could be easily determined, as estimated by the amount of crops produced on any field after being manured with it.

If the produce were increased by one element and not by another, he concluded that the first possessed a preponderating value over the second. In his trial fields, for instance, phosphoric acid had little or no effect in increasing the corn crop; whilst on the other hand, by manuring, with the same phosphates, a turnip field, a much larger crop of roots was produced than on a field unmanured. In manuring with salts of ammonia, the result was reversed; the corn crop being increased by them, but no perceptible effect being produced on turnips.

A so-called practical doctrine was derived from these facts; they proved, it was said, that nitrogen (ammonia, nitric acid,) was an especially efficacious ingredient in manure for corn, and phosphoric acid equally so for turnips.

The specific efficacy of ammoniacal salts on corn was further shown by the fact, that a field manured for several years with them alone produced equally large crops of corn during that time; and likewise, in a very striking manner, ceased on the third year to yield a crop of turnips. The great efficicacy of super-phosphate of lime on turnips was shown by the other

fact, that a field which, unmanured, gave no more turnips on the third year, produced nine crops, one after another, when this manure only was applied.

Now, a very slight reflection is sufficient, I think, to show us that this mode of testing the efficacy of the several nutritious elements of plants, is idle and useless; for if it be once proved as an empirical law, that ammonia, phosphoric acid, potash, lime, &c., are nutritious elements, and as such indispensable for all plants, there can be no further doubt of their efficacy in any single case, and no additional proof of their utility, or value, will therefore be needed. If by manuring a cornfield with salts of ammonia, or a turnip field with super-phosphate, the crop of corn or turnip roots be increased, the fact is not in the least wanted to prove the efficacy of these manures, whi [illegible] wn and undisputed; nor if by manuring a field with potash or lime, &c., no increase of crop be observed, does it therefore follow that these substances are not in themselves efficacious.

It is easy to understand that phosphoric acid, or ammonia, may not, either alone or together, exert the slightest influence on the growth of a plant. Supposing phosphoric acid, potash, lime, magnesia, silicic acid, &c., to be indispensible conditions for the efficacy of ammonia, and supposing ammonia, potash, lime and silicic acid to be indispensible conditions for the efficacy of phosphoric acid, it follows that if a wheat field, manured with ammonia alone, gives a higher return than it does without it; all that is proved is, that this field contained an excess of phosphoric acid, potash, lime, &c., inefficacious because a certain proportion of ammonia was wanting, but rendered efficacious by increasing the quantity of ammonia in the soil; while without this excess of available but not efficacious element, the largest manuring with ammonia would have had no effect. In like manner, it is perfectly plain, that if a field be deficient in potash, of which turnip roots want ten times as much as they do of phosphates, supposing the available quantity of potash be only sufficient for the formation of three crops, then only three would have been attained, and the largest dressing with super-phosphate could not produce nine.

Experiments of this kind indicate only what elements of food are abundant, or wanting, in the soil, and it is impossible to prove by them anything about the efficacy of a manure element. The increase, or non-increase, establishes only the quality or nature of a field, the knowledge of which is, undoubtedly, very useful to the owner of the land, but to him alone; for it is of no avail to his next neighbor, if the quality of this neighbor's land happens to be different.

Numberless experiments of the same character have been repeatedly made in Germany, at the instance of several agricultural societies. On many cornfields, manuring with ammonia salts had not the slightest effect, while super-phosphate of lime alone produced much larger corn crops than any other manure had afforded. It is really astonishing that farmers, who call themselves men of experience, can be made to believe that because a manure has produced, on a field in a certain country, a high return of corn or roots, it should produce an equal effect, and possess an equal value, on all the fields in Great Britain; for, if the efficacy of a manure, A, be believed to depend on the presence and quantity of the manure B, C, D, &c., it must be assumed that all the fields in a country, or land, contain the same quantity of B, C, D, &c. Now, it is an indisputable fact, that there are scarcely two fields of the same country, often not two fields on the same farm, which possess the same identical, geological, chemical, or mechanical character; so that the quantity of the manures, B, C, D, &c., varies in each instance. It must be plain, therefore, that the same quantity of manure, A, be it ammonia, phosphoric acid, or potash, must necessarily have quite a different operation in proportion as the fields are differently constituted. Even stable dung, which contains all the nutritive elements in conjunction, produced different effects when applied in the same quantity to different fields.

With reference to practical farming, it is important to remark, that it follows as a corollary from the law of equality of nutritive value belonging to the constituents of food, that the element, or elements, which are either wanting in the soil, or are contained in it in insufficient quantity, are the ones which will prove of preponderating value in the manures applied.

VIII. The chemical composition of the *human body* is known more than that of any plant; the chemical composition of our medicines is, as a general thing, more accurately known than that of the kinds of manure. If a chemist, knowing both of these compositions equally well, (of the human body and of the medicaments), wished to cure me of any disease, I would take the liberty of asking him whether he had studied anatomy and physiology; whether he was able to investigate the cause of my sickness, etc. A physician without physiology is, now-a-days, an impossibility. A scientific agriculturist will be just as impossible, after the lapse of some years, without a knowledge of the physiology of plants.

IX. In order to obtain an accurate knowledge of the life of plants, we must divide the *process of vegetation* into definite periods; we must follow up closely the development of the whole plant, and of every part of it; we must know them thoroughly. By knowing the plant thoroughly, it is not intended to mean that a knowledge of any one plant is to be accepted as a knowledge of all others; on the contrary, every *cultivated plant* must be submitted for investigation, as if it were an entirely new object, and had no similarity whatever with any other. It is evident that, to be able to understand more exactly, and to judge the *sick* plants, it is necessary to become fully acquainted with the healthy ones. And now permit us to sketch an outline of the

TASK OF AN AGRICULTURAL PHYSIOLOGIST.

The chief point of investigation of an agricultural physiologist ought to be this:

The Sowing and the Germination.—Seeding is as yet done according to old uninvestigated rules. As every farmer sows one and the same plant but once a year, he has made just as many and no more experiments—even should he be a good observer—as the years of his practice. This subject, if experimented with physiologically, might be very much advanced, even in one year. The following points ought here to be ascertained:

a. How deep is the seed to be sown? We have information on this point in the agricultural works, but they are inaccurate. Exact information can only be had, if seeds of every kind are sown simultaneously at different depths in small parcels on the same soil, the time required for the plants to appear at the surface to be accurately noted, the process of vegetation closely observed and measured, and finally, the crops compared as to their quality and quantity. Shallow sowings are, in general, better in wet soil and fast germinating seeds; deeper sowings in soils which dry readily. Seeds with tenacious coverings and weak germ ought to lie deeper than those with thin coverings and strong germ. Deeper planted

seeds of some kind of plants strike more vigorous roots, but they come up late, etc. All these things bear on the strength of the plant and the quality of crops.

b. How *closely* should the seeds be planted? This is a point not yet sufficiently observed by practitioners. There are, even here in this almost every-day matter, not yet any positive laws for every kind of seed, as there is a want of numerous and simultaneously made comparative investigations. There is surely, for every sowing and every kind of crop-plants, a certain density producing the maximum of crops for a given area; but do we exactly know this density for a single species?

c. Which *temperature* is most favorable to germination? This is practically a very important point; for the rapidity of germination as well as the power of the future plant depend greatly on the temperature of germination. Too high a temperature renders the plant rank in its very germination, especially in wet weather; too low a temperature renders the germ putrid and weakens the plant in a high degree. Now, there is a best temperature for every species, and we must not believe that the quickest germination is at the same time the best also. The most important principle herein is, that the temperature of germination differs from the best temperature of vegetation. As to the former, it may happen that the entire crop depends upon the circumstance of having sown a few days too early or too late. The best temperature of germination once being known for each field, it is then required to observe the degrees of the thermometer from day to day, in order to know the precise moment when the soil (not the air) has reached this best temperature. An accurate knowledge of this point affords many advantages. Seeds may be sown in a loose soil *before* the appearance of the best temperature of germination in spring; in a compact soil it is better to be done *after* it. It is better, in a *wet* soil, to wait for a *higher* temperature, in order to prevent the germ from rotting as this (rotting) would be an unavoidable consequence of slow germination, in airless and cold soil, etc. If frosts are to be apprehended during the time of coming up, the seeds should be planted deeper; seed which—as barley—strike their roots quickly and strongly, may be sown shallower than such of which the first roots are weak, etc.

d. Humidity.—There is nothing that prevents healthy germination to such an extent as a heavy rain-fall, when the earth is dry, after sowing; for the soil will be compact and deprive the germ of air. The roots of the grown plant may prosper even in a soil devoid of air, as the interior parts of the plant will convey air to them; but the germ has no such communication with the atmosphere. Humidity in germination is a point yet to be investigated. If the seed has previously been properly soaked, it can

germinate quickly and healthily in a loose and pretty dry soil. Germinating roots avoid a wet, cold soil much more than old roots, and the injury is permanent in retarding growth, if not as to the quantity of the crop. In sowing, the result of the crops ought always to be borne in mind; if it ripens one day later, it may be injured by rain.

Condition of Air during Germination.—Air stagnates in the soil when there is no wind; a perpendicular circulation of air is caused in the soil, downward, by wind. If, therefore, *deep* sowing is required, it is better to do it before wind rises; but here there is still a large field open to investigation.

f. Looseness and Fineness of Soil.—There is, besides proper temperature and moisture, nothing that accelerates germination as much as a very loose, airy soil. But very loose soil is subject to great flunctuations of temperature; it requires, therefore, deeper sowing, especially as it readily parts with its moisture, and nothing injures the germ so much as complete dessiccation or drying. A poor crop may always be expected from a poor soil, but, if it is not too sterile or marshy, the failure of germination must be attributed to bad sowing. A fine soil permits a rapid and deep penetration of roots, while hard clods will change the direction of roots and cause a great loss of time to the plant.

All the conditions of germination just mentioned ought to be submitted to thorough experiments before a rational prescription can be given for sowing. The experiments—to be marked in diaries—ought partly to be made in the fields, partly in pots, partly in glass vessels (in order to see the roots), and continued to the time of ripening. Here is a work of years for a physiologist.

The Crop.—The safety of the crop depends sometimes on a day, on hours; a slowly-gathering, general rain may render a late crop valueless. In such cases, if it could be harvested a few days sooner, all would be right. But the exact moment of ripening is not known! It might sometimes be very important not to wait for that moment, if it was known for a certainty whether the grains are in a state to be equivalent to a crop, and whether they are capable of germinating!

Treatment during Vegetation.—Very little, comparatively, in a practical sense, can be said of treatment with regard to the several species of grains; more, however, is known in relation to forage plants, Indian corn, etc. The effects of plucking off the leaves, of earthing, ventilating the soil, etc., are as yet too problematical, and will remain so, as long as *good* experiments do not give more light on the subject.

The most important studies of an agricultural physiologist are experiments: demonstrative experiments as to *the functious of the various organs,*

especially in different plants. What is *known* upon this subject? What purpose do leaves, roots, and stem serve? General or very trivial principles only are known about them. But what is desirable or important to know, is the functions of each organ in each plant. This must be discovered partly by experiments and partly by their anatomical structure.

Functions of the Roots. All that is known for certain about this is that they absorb fluids by endosmose, and with these fluids dissolve salts and absorb gases. The following practically important questions are here to be examined:

a. What part of the root absorbs fluids? The views on this subject are very contradictory. Men of great reputation believe that the ends of the roots are the main organs of absorption, while others with equal assurance assert that the simplest physiological knowledge has established that the very ends of the roots have *nothing at all* to do with this absorption.

b. How does time influence the activity of roots? It is concluded from the changed anatomical structure of the old roots, that they operate entirely different from what they did when they were young and tender. This would account for the difference in the absorbtion of nutritious matter during the different periods of age.

c. What is the relation of roots to gases and vapors? The roots find water only at certain times in a good soil obtained by draining; the soil at other times contains vapors, but the plants, nevertheless do not wither. Do the roots absorb carbonic acid?

d. What external influences cause the rise and prolongation of secondary roots? Does the power of vegetation depend on the number and size of roots?

e. Do the roots grow at the expense of the parts above earth? Can they continue growing after the latter have been cut away? How do the roots of marsh plants differ from those on dry land?

f. What substances are peculiar to the root? What ones do not exist in it?

g. How are the absorbed fluids conducted upward by means of the roots? Do the roots force the sap in an upward direction? Do the roots secrete any substances? How many and what ones?

h. How may a shallow or deep striking of roots be produced? In what cases will a shallow striking of roots operate more favorably?

i. How is the striking of roots connected with the leaf—quantity and stem—formation? How do the roots operate in penetrating through various strata of soil?

j. At what time is the formation of new roots still desirable for the crop?

Any new formation—also the one of roots—directly diminishes the crop; which diminution must be exceeded by subsequent operations of the roots. The period of hoeing or stirring and ventilating the soil depends upon that point. The respective experiments have yielded negative results, probably because it was done too late. The non-physiologists have, as a general thing, an incorrect idea of the plant's process of development: the mere development is confounded with the new formations; the time in which the organ exhausts the plant by its origin is confounded with that in which this organ is useful to the plant by its function.

Functions of the Stem. *a.* How is the sap conducted in the stem—from above downward, or from below upward? What function does the bark, the core, and vessels perform? How is a solid vigorous stem obtained?

b. Is it better to promote side-shoots under equal circumstances? Can side-shoots increase the crop of grain when they do not bear ears? At what time is the origin of side-shoots useful; when does it weaken the plant?

c. The potatoes are stem formations, and must be treated as such in rational agriculture. Is it better to increase their number at the cost of their size, or their size at the cost of their number?

d. Do the subterranean stem-parts depend upon those above earth, in the same manner as the roots?

Functions of the Leaves. It must be remembered that the leaves absorb no vapors (water), and no running water. A great number of facts which were accounted for in this manner according to old prejudice, must now be otherwise explained.

a. Do the leaves absorb gases, as for instance, ammonia?

b. How do the leaves of grasses differ from those of the fruit plants in their functions? Their inner structure is very different.

c. The evaporation of the vegetation water is one of the most important functions of the leaf, as it supports the motion in the plant. It is necessary to learn exactly, by means of accurate experiments, the amount of evaporation from the leaves of each cultivated plant, especially during various periods of vegetation. The old statements of *Hales* are absolutely unavailable.

d. The very general opinion that *a rapid evaporation from the leaves, with the simultaneous absorption of water by the roots, was a favorable relation of vegetation is utterly false.* Too strong a circulation of water in the plant, occasioned by rapid evaporation, hinders the quiet assimilation within the cells, and brings too many inorganic salts into the plant.

e. The evaporation from leaves is decreased when the plants stand too close, therefore the proper distance of plants apart ought to be known.

f. What relation does the development of leaves bear to the formation

of stem and root? Under what circumstances is it advisable to promote the formation of leaves? Are the leaves really the organs of assimilation? What change in the functions of leaves does time produce?

Blooming.—a. Essential changes take place in the entire plant during the period of blooming, but the plants are thereby differently affected. Such species as have a distinctly fixed inflorescence (as the species of corn) have a strictly separate period of vegetation and another of blooming; others are blooming and vegetating at the same time.

b. How does nutrition take place during the blooming period; how do air and warmth operate during fructification? Since the period of fructification is very short, and the crop depends mainly upon it, the sowing is to be done so that fructification will take place on favorable days. Nothing is as yet known as to this point.

c. Is it more conducive to the crop to increase the number of germs at the cost of their power, or *vice versa*? Is it a fact in the cultivation of corn grains that small grains contain relatively more albumen than large ones?

Formation of Fruit.—Is the absorption of nutritious matter still of any use during the formation of fruit? Whence does fruit principally take its substances?

There are, besides these questions on the functions of the organs, many more on the functions of textures common to the organs. Experiments ought, moreover, to be made on a large scale as to the *formation of varieties.* Every fruit and vegetable gardener is aware that the entire success of his art depends upon the peculiarities of a variety. The known varieties of the cultivated plants need a thorough revision. The most rational method of culture must lead to bad results as long as the cultivated variety is not understood beyond any doubt.

There can be no doubt as to the importance of all these investigations for agriculture. But all these questions are not chemical ones: they are physical, anatomical, and physiological. Much, very much, can be done here without chemistry, but *it is only the combination of Chemistry with Physiology that can create an accomplished science.*

We have thus, at considerable length, indicated some leading topics, a practical knowledge of which would enable the farmer to economize labor to a much greater extent than can at present possibly be done.

A proper estimate and appreciation of the value of labor, has never been acknowledged by any government during the historic period of human existence. Labor has always been held to be menial and to be subordinate to every other human acquirement. The present rebellion may be viewed as a renewal of the struggle for the continuance of the mastery or

despotism of capital over labor. Educated and intelligent labor was making more rapid strides in the Northern or free States, than anywhere else in the known world, and bid very fair, in a short time, as a legitimate consequence, to compete with capital in the great work of civilization, enlightenment and refinement of society. In direct competition with intelligent labor, slave-labor became unprofitable; hence the necessity of restricting and limiting the area of intelligent labor, and not only enlarging that of slave-labor, but requiring additional protection for the institution of slavery. In the free States capital appreciated the dignity of labor—did what it could to educate and elevate it, and, when educated, accepted it as a partner upon terms of perfect equality—hence the rapid progress made in improvements of all kinds in the free States. Labor was interested in developing new sources of industry, and consequent wealth, whilst capital was equally interested in giving permanence to our institutions, and developing new sources of wealth. Intelligent labor in the North has never assembled as a mob to destroy threshing machines, and reapers and mowers, as the farm-laborers did in England; neither did the hand-loom weavers congregate as a mob to destroy the power-looms. What then? The free American laborers combined to purchase these very machines which were performing the same office which the laborers formerly did. All could not do this, and those who were unable to make such purchases, found an abundance of labor in other directions. The American laborers in the free North rejoice over the invention of every machine which relieves their "bones and sinews" from the performance of that particular kind of labor. Why? Because these laborers are intelligent and know perfectly well that capital will cheerfully aid them in any new enterprise which will open up a new source of industry, or which will more fully develop one already initiated. The tendency in the North and "Great West" has been to secure reciprocal co-operation between capital and labor; the rebellion has given this tendency an impetus which could scarcely have been acquired in half a century of profound peace.

No person is more deeply and directly interested in this reciprocal co-operation of capital and labor than the agriculturist, and to show clearly how much more important labor is than capital, if there should be any occasion to draw a broad line of demarcation between them, may be inferred from the statement of a single fact, viz.: that if all the property, real and personal, in the loyal States, at the time of the breaking out of the rebellion, had been put to sale at aution, and the terms "cash," to be paid in gold and silver, it could not have been sold for more than *two* cents on the dollar of the estimated value as returned by assessors for taxation. The

actual cash capital of the country then bore the proportion of *two*, to ninety-eight of the labor capital—because property is intensified labor, and property is valuable only in proportion to the amount of labor which has been bestowed upon it. It may be stated that a vacant city lot in Columbus is worth $5000, whilst an entire section of land may be purchased for less money in Paulding county. If labor makes the great difference, then what extraordinary labor has been performed on the vacant city lot? We reply that when the same amount of every kind of labor is represented by its products within the radius of a mile from all the boundaries of the section in Paulding, that has been performed within that distance of the city lot, that then it will be relatively just as valuable as the city lot.

It is not *always* the scarcity of an article which causes its price to be comparatively high; neither is it the great abundance of an article which invariably causes it to be cheap. From 1840 to 1850 gold seldom was more than one per cent. premium, and notwithstanding the millions of gold brought into the Eastern, Northern and Western States from 1850 to 1860, gold did not decline one per cent.; neither was there an advance on labor or on articles of industrial product in a corresponding degree, which the influx of gold should have produced, if abundance *always* cheapens. In 1864 there is probably as much gold in the United States as there was in 1860, and yet it has risen to 1.75 per cent. premium. But this premium on gold is purely speculative, for the government is under just the same obligation to redeem its issues of gold as it is to redeem its issues of "greenbacks," or any other evidence of indebtedness. The commerce and productive industry of the country are pledged for the redemption of either or both.

The present high prices of labor are not entirely due to the scarcity of labor, and in fact the price of labor, except for that of coal diggers, has not advanced in the same ratio with many of the products of labor. Iron, for example, is just as abundant in the whole country as it was at any time, and yet it is worth just *eight* times as much as it was in 1860. Taking iron as the standard of value, instead of gold, labor should command eight times as much as in 1860.

Since the advance in the rates of wages, labor has been much more judiciously, and therefore more economically, applied than heretofore. All the assistance which machinery could give to manual labor, has been conjointly applied with it, and therefore, if not as cheap as heretofore, produces greater results.

Annexed will be found a table of the present rate of wages (1864) in the various departments of productive industry in several counties in the State:

	Carriagemakers.	Coopers.	Turners.	Trunkmakers.	Chairmakers.	Cabinetmakers.	Carpenters.	Miners.	Masons.	Brickmakers.	Bricklayers.	Stonecutters.
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Carroll	3 00	....	....	....	3 00	3 00	3 00	4 00	2 50	2 00	2 50	2 50
Champaign	2 25	2 50	....	....	2 75	2 75	2 75	....	3 00	2 50	3 00	....
Darke*	2 50	3 00	2 50	....	....	2 50	2 00	...	2 00	2 00	2 50	2 50
Fairfield	2 50	2 00	....	....	2 00	2 00	2 50	....	3 00	1 50	3 00	3 00
Fayette	3 00	....	....	....	2 10	2 50	3 00	....	3 50	3 50	3 50	....
Henry	3 00	3 00	....	....	3 00	3 00	3 00	....	3 00	2 25	3 25	3 00
Jackson	....	2 25	2 50	....	2 50	2 50	2 50	3 50	2 50	2 00	2 00	3 00
Lake	2 00	2 00	....	....	2 00	2 25	....	....	2 25	....	....	....
Lawrence	3 50	3 50	....	....	3 50	3 50	3 50	2 50	3 00	4 50	4 50	3 00
Lucas†	....	....	....	....	....	....	....	....	....	....	....	....
Meigs	....	2 00	....	....	2 50	2 50	3 00	5 00	3 25	....	3 50	3 50
Monroe	2 25	2 25	....	....	....	2 00	2 25	....	2 25	2 25	2 25	2 25
Morgan	2 00	2 00	2 00	2 00	2 00	2 00	2 00	5 00	3 00	2 00	2 75	3 00
Portage	2 50	2 50	2 50	....	2 50	2 50	2 25	....	3 50	3 50	3 50	3 50
Preble	3 50	2 50	....	....	2 50	2 50	3 00	....	3 00	2 50	3 00	3 00
Sandusky	2 50	....	2 75	....	2 50	2 50	2 50	....	3 00	2 00	3 25	3 50
Union‡	....	2 50	....	....	....	3 00	3 00	....	3 00	1 75	3 00	....
Van Wert	2 50	2 50	....	....	2 50	3 00	3 00	....	2 50	2 50	2 50	....
Warren	2 75	2 50	....	....	2 50	2 50	2 50	....	3 00	3 00	3 50	3 00
Wyandot§	....	2 00	....	....	....	2 50	3 00	....	2 00	3 00	3 00	3 50

	Jewellers.	Patternmakers.	Moulders.	Pudlers.	Nail cutters.	Lockmakers.	Tinners.	Watchmakers.	Locksmiths.	Gunsmiths.	Blacksmiths.	Farm laborers.
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Carroll	...	....	2 00	....	....	....	2 00	....	....	....	2 50	1 50
Champaign	2 50	....	2 50	....	....	....	2 50	2 50	....	....	3 00	2 00
Darke*	....	....	....	....	....	....	2 00	2 50	....	....	2 50	1 50
Fairfield	....	3 00	....	....	....	....	2 50	....	....	....	2 50	1 00
Fayette	2 50	...	....	....	....	....	1 75	2 50	....	....	3 00	2 00
Henry	....	....	....	....	....	....	2 50	....	....	2 50	2 50	2 00
Jackson	2 50	3 00	2 50	3 00	....	....	2 50	3 00	....	3 00	3 00	1 25
Lake	....	....	....	....	....	....	....	....	....	2 00	....	1 50
Lawrence	3 50	3 50	3 50	5 00	3 50	....	2 50	3 50	4 00	3 50	2 50	1 00
Lucas†	....	....	....	....	....	....	....	....	....	....	....	2 00
Meigs	....	....	....	....	....	....	3 00	....	...	3 00	3 50	1 50
Monroe	....	....	....	....	....	....	....	....	....	1 75	1 25	1 25
Morgan	2 00	2 50	2 50	....	....	2 00	2 00	2 00	2 00	2 00	2 00	1 50
Portage	3 00	3 00	2 25	....	....	....	2 00	3 00	....	2 00	2 50	2 00
Preble	....	....	....	....	....	....	2 50	....	....	....	2 50	1 50
Sandusky	2 00	2 00	2 25	....	....	....	2 00	2 00	....	....	2 00	1 75
Union‡	....	....	....	....	....	[illegible] 00	2 00	....	....	....	2 50	1 25
Van Wert	....	....	2 50	....	....	....	3 00	....	....	3 00	3 00	1 50
Warren	3 00	....	....	....	....	....	2 50	2 50	..	3 00	3 00	2 00
Wyandot§	...	....	....	....	....	....	2 50	...	2 50	3 50	....	1 25

* Carriagemakers, coopers, turners, cabinetmakers, carpenters, masons, brickmakers, watchmakers, blacksmiths and farm laborers receive their board in adddition to their wages.

† Mechanics from $3 to $4 per day.

‡ Brickmakers and farm laborers receive their board in addition to their wages.

§ Farm laborers receive their board in addition to their wages.

	Segarmakers.	Sailors.	Brewers.	Soapmakers.	Butchers.	Millers.	Bakers.	Hatters.	Weavers.	Tailors.	Painters.
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Carroll	2 50	....	....	....	2 00	2 50	....	....	....	3 00	2 50
Champaign	2 50	....	....	....	2 50	2 50	2 50	....	....	2 25	2 75
Darke*	....	....	2 00	....	2 00	2 00	2 00	....	....	2 50	2 50
Fairfield	....	....	....	....	2 50	2 00	1 75	....	2 00	2 00	3 00
Fayette	....	....	....	....	3 50	2 50	....	....	....	3 50	....
Henry	....	....	....	....	....	3 00	....	....	....	3 00	3 00
Jackson	....	....	....	....	....	2 00	....	....	2 50	....	2 50
Lake	2 00	....	....	....	....	....	....	....	....	2 00	2 00
Lawrence	3 00	....	2 50	....	2 50	3 00	3 00	....	....	2 50	3 50
Lucas†	....	....	....	....	....	....	....	....	....	....	....
Meigs	....	....	2 00	....	....	....	....	....	....	2 00	2 50
Monroe	....	....	2 00	....	1 50	1 50	2 00	....	....	2 00	2 25
Morgan	2 50	....	2 50	2 00	2 00	2 00	2 00	2 00	2 00	2 00	2 00
Portage	....	....	....	....	2 00	2 00	....	....	....	2 25	2 50
Preble	....	....	....	....	....	....	....	....	....	2 50	2 00
Sandusky	....	....	....	....	....	2 00	....	....	....	....	2 50
Union‡	....	....	....	....	....	2 00	....	....	....	1 75	3 00
Warren	2 50	....	2 50	....	2 50	3 00	2 50	2 50	2 75	2 75	3 00
Wyandot	....	....	....	....	....	....	....	....	....	1 75	....

	Paperhangers.	Papermakers.	Bookbinders.	Printers.	Glass blowers.	Glass-stainers.	Glaziers.	Tanners and Curriers.	Upholsterers.	Harnessmakers.	Saddlers.	Shoemakers.	Carriage trimmers.
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Carroll	....	....	....	2 00	....	....	....	2 50	....	3 00	3 00	2 50	....
Champaign	2 50	....	....	2 50	....	....	2 50	2 50	2 50	2 25	2 25	2 50	2 25
Darke*	....	....	....	2 00	....	....	....	2 00	....	2 50	2 50	2 50	2 00
Fairfield	3 00	....	....	2 00	....	....	....	2 00	....	2 00	2 00	2 00	2 50
Fayette	....	....	....	2 00	....	....	....	....	....	3 00	3 00	3 50	3 50
Henry	....	....	....	2 50	....	....	....	....	....	3 00	3 00	3 00	....
Jackson	....	....	....	2 50	....	....	3 00	3 00	....	2 50	2 50	2 00	....
Lake	2 00	....	....	....	....	....	2 00	2 00	2 00	2 00	....	2 00	2 25
Lawrence	3 50	....	....	2 50	....	....	3 00	2 50	....	2 25	2 50	3 00	3 50
Lucas†	....	....	....	....	....	....	....	....	....	....	....	....	....
Meigs	2 50	....	....	2 00	....	....	....	2 00	....	3 00	3 00	2 50	....
Monroe	2 00	....	....	2 25	....	....	2 25	2 25	....	2 00	2 00	2 00	2 25
Morgan	2 00	....	....	2 00	....	....	2 00	2 00	2 00	2 00	2 00	2 00	2 50
Portage	....	....	....	3 00	5 00	....	....	1 75	3 00	1 75	....	2 00	....
Preble	....	....	....	2 00	....	....	....	....	....	....	2 00	2 50	3 00
Sandusky	2 50	....	....	2 50	....	....	2 50	....	....	....	....	1 50	3 00
Union‡	....	....	....	....	....	....	....	2 50	....	2 50	2 50	2 00	....
Warren	3 00	....	....	3 00	....	3 00	3 00	3 00	3 00	3 00	3 00	3 00	3 50
Wyandot	....	....	....	....	....	....	....	1 50	....	1 50	2 00	2 00	....

* Brewers, butchers, millers, bakers and carriage trimmers receive their board in addition to their wages.
† Mechanics from $3 to $4 per day.
‡ Millers and tailors receive their board in addition to their wages.

In all civilized and enlightened countries agriculture furnishes direct employment to the larger portion of the inhabitants. The proportion of the entire population engaged in agriculture, in the various countries, are as follows:

1. England	73	per cent.	7. Baden	55	per cent.
2. France	51.4	" "	8. Austria	78	" "
3. Russia	70	" "	9. Hanover	85	" "
4. Sweden	74	" "	10. Belgium	76	" "
5. Prussia	58	" "	11. Ohio	56.5	" "
6. Bavaria	65.6	" "			

The absolute necessity for agricultural pursuits does not require any more argument to prove it than it does to prove the axiom in geometry that a *straight* line is the *shortest* distance between any two given points. When the contrary is once proved, it will then be proper to introduce arguments to sustain the proposition, or rather statement. Since the pursuit of agriculture, in its varied branches, is one of absolute and almost unremitting *labor*, and since so large a proportion of the civilized and enlightened world is engaged in it, it may be well to take a cursory glance at what is being done for its encouragement by the respective governments.

In Prussia there is a "Ministry of Agricultural Affairs;" the statements and suggestions of this ministry govern not only the revenue, but the action of the Banks, the Rural Economical College, the Revisory College for Agriculture, and the general commissions in the provinces for the adjustment of the relations between the proprietors and their tenants.

The State Economical College is composed of officers of different ministerial departments and practical agriculturists. There are numerous other institutions in Prussia for the encouragement of agriculture; among these are six Agricultural Trust Institutions and the Royal Trust Institution for Silesia, at Breslau; the Trust and Sinking Fund Institute in Westphalia; the "Ceres Trust Company" in Berlin, with a capital of three million thalers; the National Trust Company, for the Rhine provinces Westphalia, at Cologne, with a capital of twelve million thalers; the Provincial Aid and Amelioration Fund Institute, and 408 Agricultural Societies. An account of these societies was given in the Ohio Agricultural Report for 1862, page xiii.

The Prussian Government spares no expense for the encouragement and further development of agriculture, whether by extraordinary aid in any manner, or by model and experimental farms, by the distribution of breeding animals, the establishment of government tileries, and drainage work, or otherwise.

In 1853 (the latest official report at command in this office) the Prussian

Ministry of Agriculture expended 90,000 thalers for improvements in agriculture; 16,300 thalers for instruction in agricultural colleges of the higher grades, and 20,000 in those of lower; 10,925 thalers to societies; 24,200 thalers for improvements in horse-breeding, and 34,717 thalers for underdraining and ditching; being an aggregate expenditure of nearly 200,000 thalers.

In Saxony the State Board of Agriculture acts in the capacity of an advisory body to the Ministry of the Interior. It has under its immediate control four agricultural trust fund associations and several agricultural insurance companies. It also holds an annual Fair for the exhibition of live stock, agricultural implements, and products.

In Wurtemburg a Special Central Board of Agriculture is attached to the Ministry of the Interior. It has charge of sixty-two province (county) Agricultural Societies; the Trust Fund Society; Marker Treasury, and complete control of the Farmers' Bank.

In the Grand Duchy of Baden is a Central Board of Agriculture attached to the Ministry of the Interior, under whose direct control are five districts and 48 provincial (county) societies. This Board is entirely independent in its transactions.

In Hesse Cassel is a Central Board of Agriculture also attached to the Department of the Interior, with an annual fund of 2,000 thalers.

In the Grand Duchy of Hesse Darmstadt the Central Board is a branch of the Interior Department. This Board, in three consecutive years, expended 267,665 guilders in the promotion and improvement of agriculture.

In Belgium the Department of the Interior is also the Department or Board of Agriculture. This board has 30 agricultural societies and 77 special agricultural committees under its direction. These special committees are chosen from among the most intelligent farmers by the authorities, but are independent in their organization and action. The agricultural societies are under the direction of the Central Agricultural Society, at Brussels.

Belgium is considered *the* model country of rational and progressive agricuture in continental Europe. The culture of the soil and cattle-breeding have there attained such a degree of perfection, that in proportion to her area, even including the less fertile provinces of Luxembourg and Namur, no country in Europe can exhibit as large an amount of productions in both branches of agriculture.

France has a Ministry of Agriculture, Commerce and Public Works. The numerous agricultural schools, cattle shows, agricultural commissions which are located in every department, numerous trust and other societies

for the encouragement of agriculture, and chiefly the *credit foncier* for procuring loans upon mortgages, and issuing bonds,* together with many agricultural societies, among which the Central Association for Agriculture, at Paris, give evidence of her energy and activity in Agricultural affairs.†

The Ministry of Agriculture has under its control the improvement and perfection of the methods employed in agriculture, the management and instruction of agricultural and veterinary schools, the distribution of indemnifications for losses by accident and cattle diseases, the suggestion and execution of the laws relating to the sources of subsistence, and the management of the studs.

The first section of the Ministry is called the Department of the Secretary-General, and with it is united a special bureau called "Chamber of Accounts," which is really a depot for agricultural accounts, statistics, and charts and plans of agricultural improvements.

The *third* section is the Department of Agriculture proper, and consists of the following three bureaus, viz: (1.) Agricultural and Veterinary Instruction; (2.) Financial and other aid or assistance in the encouragement of Agriculture; (3.) Legislation relative to the sources of subsistence. The *fourth* sub-division is that of the *studs*. It consists of a single bureau, viz: Encouragement of horse-breeding, or administration of the stud and stallion depots. A Supreme Council of Commerce, Agriculture and Industry; a General Council of Agriculture (*conseil general d'agriculture*); a commission for the registration of thoroughbred cattle; a commission for studs; a commission for the registration of thoroughbred horses, &c., &c., are attached to the Ministry. The external service of the Ministry comprises, among other things, the superintendence of the Imperial agricultural schools, the farmers' schools, veterinary schools, and studs.

The numerous agricultural societies of France ‡ (*comices agricoles*) are voluntary associations of farmers—five or six departments or counties have none. They receive material aid from the State Treasury. The government exerts its influence upon agriculture by means of material encouragements, subventions, laws and ordinances for the more unrestricted development of agricultural resources. The Legislature has made provision for gradually laying dry morasses and swamps, and for the fortification of the land dunes along the water courses. The consequence is an

* The total amount of loans realized since the organisation of the Institution (1852) to the 31st of December, 1857, was 83,496,130 francs.

† 1856 the Government appropriated 100,000,000 francs for underdraining.

‡ At present, 524.

increase of live stock, an abundance of manures, and hence, proportionally larger crops.

In Sardinia there exists a "Chamber of Agriculture," but in the Papal States there is a Ministry of Commerce, Arts, Industry, Agriculture, and Public Works.

Spain has a Ministry for national prosperity, whose sphere comprises public buildings, agriculture and forestry, mining, commerce, and general industry.

In Russia the "Ministry of the Imperial Domains" has the control and management of agricultural affairs, and provides means for its improvement and further development. It aids agriculture in every possible manner, especially by the exemplary methods of cultivation on the domains. In some provinces agricultural schools and model farms have been established.

In Sweden a Department of Agriculture is attached to the Minstry of the Interior.

In Turkey is a Ministry of Commerce, Agriculture and Public Works, similar to that of France.

In England, Scotland, and Ireland, there is no governmental department of agriculture, but the "Royal Agricultural Society" receives an annual stipend from the treasury for the encouragement of agriculture and the advancement of its interests. In Scotland is the "Highland and Agricultural Society of Scotland," which also receives government aid.

In all these European countries agriculture is making great progress: this is partly due to the interests which the several governments take in fostering and developing it; and more yet is due to the fact that in all these countries are agricultural schools and colleges, and experimental farms, which have engaged the attention of the most thorough scientific minds and practical men.

Agricultural societies have existed during the past quarter of a century in the United States, and much of the progress in this industrial branch is due to the healthful influence exercised by these societies. An agricultural college was organized and put in successful operation in Centre county, Pa., and one was about being organized at Ovid, in the State of New York. On the 2d of July, 1862, the following bill, passed by Congress, was approved by the President, and almost all the loyal states have accepted the grant contained therein:

"An act donating lands to the several States and Territories which may provide Colleges for the benefit of Agriculture and the Mechanic arts.

"*Be it enacted by the Senate and House of Representatives of the United States of America in Congress Assembled*, That there be granted to the several States for the purposes hereinafter mentioned, an amount of public land to be apportioned to each State a quantity equal to thirty thousand

acres for each senator and representative in Congress, to which the States are respectively entitled by the apportionment under the census of eighteen hundred and sixty: Provided that no mineral lands shall be selected or purchased under the provisions of this act.

"SEC. 2. *And be it further enacted*, That the land aforesaid after being surveyed, shall be apportioned to the several States in sections or subdivisions of sections not less than one quarter of a section, and whenever there are public lands in a State subject to sale at private entry at one dollar and twenty-five cents per acre, the quantity to which said State shall be entitled shall be selected from such land within the limits of such State, and the Secretary of the Interior is hereby directed to issue to each of the States in which there is not the quantity of public lands subject to sale at private entry at one dollar and twenty-five cents per acre, to which said State may be entitled, under the provisions of this act, land scrip to the amount in acres for the deficiency of its distributive share, said scrip to be sold by said States, and the proceeds thereof applied to the uses and purposes prescribed in this act, and for no other use or purpose whatsoever: Provided, that in no case shall any State to which land scrip may be thus issued, be allowed to locate the same within the limits of any other State or of any Territory of the United States; but their assignees may thus locate said land scrip upon any of the unappropriated lands of the United States subject to sale at private entry, at one dollar and twenty five cents per acre; and provided further, th not more one million acres shall be located by such assignees in any one of the States; and provided further, that no such location shall be made before one year from the passage of this act.

"SEC. 3. *And be it further enacted*, That all the expenses of management, superintendence, and taxes, from date of selection of said lands, previous to their sales, and all expenses incurred in the management and disbursement of the moneys which may be received therefrom, shall be paid by the States to which they may belong out of the treasury of said States, so that the entire proceeds of the sale of said lands shall be applied without any diminution whatever to the purpose hereinafter mentioned.

"SEC. 4. *And be it further enacted*, That all moneys derived from the sale of the lands aforesaid by the State to which the lands are apportioned and from the sales of the land scrip hereinbefore provided for shall be invested in stocks of the United States, or of some other safe stocks, yielding not less than five per centum upon the par value of said stocks, and that the moneys so invested shall constitute a perpetual fund; the capital of which shall remain forever undiminished (except so far as may be provided in section fifth of this act), and the interest of which shall be inviolably appropriated by each State which may take and claim the benefit of this act to the endowment support and maintenance of at least one college, where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such a manner as the legislatures of the States may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life.

SEC. 5. *And be it further enacted*, That the grant of land and land scrip hereby authorized, shall be made on the following conditions, to which as well as to the provision hereinbefore contained the previous assent of the several states shall be signified by legislative act:

"1st. If any portion of the fund invested, as provided by the foregoing section, or any portion of the interest thereon, shall by any action or contingency, be diminished or lost, it shall be replaced by the State to which it belongs, so that the capital of the fund shall remain forever undiminished, and the annual interest shall be regularly applied without diminution to the purposes mentioned in the fourth section of this act, except that a sum not exceeding ten per centum upon the amount received by any State under the provisions of this act may be expended for the purchase of lands for sites or experimental farms whenever authorized by the respective legislatures of said States.

"2d. No portion of said fund nor the interest thereon shall be applied directly or indirectly

under any pretense whatever, to the purchase, erection, preservation, or repair of any building or buildings.

"3d. Any State which may take and claim the benefit of the provisions of this act, shall provide within five years at least not less than one college as described in the fourth section of this act, or the grant to such State shall cease, and said State shall be bound to pay the United States the amount received of any lands previously sold, and that the title to purchase under the State shall be valid.

"4th. An annual report shall be made, regarding the progress of each college, recording any improvements and experiments made, with their cost and results, and such other matters including State industrial and economical statistics as may be supposed useful; one copy of which shall be transmitted by mail, free, by each, to all other colleges which may be endowed under the provisions of this act, and also one copy to the Secretary of the Interior.

"5th. When lands shall be selected from those which have been raised to double the minimum price, in consequence of railroad grants, they shall be computed to the States at the maximum price, and the number of acres proportionally diminished.

"6th. No State while in condition of rebellion or insurrection against the Government of the United States, shall be entitled to the benefits of this act.

"7th. No State, shall he entitled to the bene act, unless it shall express its acceptance thereof by its legislature within two years from the date of its approval by the President.

"SEC. 6. *And be it further enacted*, That land scrip issued under the provisions of this act shall not be subject to location until after the first day of January, one thousand eight hundred and sixty-three.

"SEC. 7. *And be it further enacted*, That the land officers shall receive the same fees for locating land scrip issued under the provisions of this act as are now allowed for the location of military bounty land-warrants under existing laws: Provided their maximum compensation shall not be thereby increased.

"SEC. 8. *And be it further enacted*, That the Governors of the several States to which scrip shall be issued under the provisions of this act, shall be required to report annually to Congress all sales made of such scrip until the whole shall be disposed of, the amount received for the same, and what appropriation has been made of the proceeds."

During the session of the Ohio legislature in 1864, a bill (H. B. No. 4) was passed accepting this grant of 630,000 acres for the State of Ohio, and at a later period in the year the Governor received land scrip for that amount. Several bills for the organization of several agricultural colleges were presented to the legislature, as well as memorials from the trustees of the college at College Hill, near Cincinnati; Ohio University, at Athens; Miami University, at Oxford, and Mt. Union College, at Mt. Union, Stark county, Ohio. A committee consisting of the Senate and House committees on "Agriculture," and "Colleges and Universities," visited the college near Cincinnati, and subsequently reported to the legislature that "We would therefore recommend that the trustees and stockholders of Farmers' College be requested to leave open their proposal now before this General Assembly, in order that future action may be had upon this subject, with due regard to the highest and best interests of the whole State." Some members of the legislature were of opinion that an agricultuaal department

attached to existing colleges in the State, would prove to be all that agriculture or its interests would require; others were for establishing three or more exclusively agricultural and mechanical colleges, whilst many were of opinion that agriculture proper could receive no permanent benefit from science or special agricultural education.

Those who are of opinion that science properly applied, or special education for that purpose, can be of no benefit to agriculture can not certainly be familiar with the history of agriculture during the past century in Europe. A few facts and figures in relation to this point may not be out of place here. In Prussia the area cultivated at present is the same that it was a hundred years ago. Annexed is a tabular statement of the product per square (Prussian) mile, together with the product *per capita* of the population in 1755, 1800, and 1854:

	1755.		1800.		1854.	
	Bushels.	Per capita.	Bushels.	Per capita	Bushels.	Per capita.
Wheat	1,023	0·36	2,653	0·78	18,391	2·53
Rye	11,240	4·21	16.891	5·78	34,100	4·67
Barley	5,403	2·08	7,448	2·53	14,850	2·00
Oats	8,092	3·06	10,750	3·64	40,726	5 57
Mixed crops	467	0·13	405	0·12	8,455	1 10
Peas	319	0·12	393	0·10	8,378	1·21
Potatoes	793	0·25	8,307	2·84	119,735	16 38
	28,337	10·21	46,847	15·79	244,635	33·46
Population	2,641	....	2,951	....	7,310	

From this statement it will be seen that in 1755 the population was 2,641 per square (Prussian) mile—equal to about sixteen of our square miles—and that the entire product per square mile of all the crops used as food for the inhabitants, amounted to ten and one-fifth bushels for every individual. About 1780 considerable attention was directed to improvement in agriculture in that country, and by the year 1800 the aggregate of cereal crops was almost doubled, or would have given every individual, if the population of 1755 had not increased, seventeen and three-fourth bushels, but as the population did increase somewhat, the average *per capita* was a little over fifteen and three-fourth bushels. About 1800 the doctrines of Thaer and Von Fellenberg were finding a practical response in the improvement of almost all departments of agriculture. Agricultural schools, colleges, universities, and experimental farms sprang up in many places in Prussia. The result of this agricultural education is that in 1854, when the population amounted to 7,310 per square mile, the aggregate

production amounted to 244,635 bushels, or about *nine* times the amount produced on the same area one hundred years previous, and gave an average of thirty-three and one-half bushels to every individual of a population which had almost tripled during the century.

The population per square mile of 1854 could not have been subsisted on the product of a square mile in 1755, whilst the population of 1755 would have had more than nine times the amount in 1854 than they had in 1755. No one will argue that the soil of its own accord really became *more* productive by reaping a hundred crops from it. The increased productiveness then must be attributed to an improved system of culture, and this improved system could have had no other origin than intelligence, or, in other words, APPLIED SCIENCE. The figures just quoted are a much stronger argument in favor of agricultural education than the most rhetorical essay could possibly make.

If special education is of advantage anywhere, it must be of greater advantage in agriculture to society in general than in any other industrial pursuit—indeed of greater advantage than in any other pursuit whatever, because it is the application of knowledge (which is nothing more than a more common name for *science*) to the production of the raw material. When and where the *raw* material can be produced in great abundance and cheaply, all else consequent upon it follows more rapidly, and with greater advantage to society at large. If breadstuffs, the "staff of life," and material for clothing, are abundant and cheap, then more time may be devoted to social intercourse, study, and the development and culture of the better and more refined qualities of our natures.

But the *practical* man objects to teaching agriculture in schools and colleges, and insists that "farming" cannot be either learned or taught properly, except upon the farm itself. He objects to teaching chemistry, botany and geology, with reference to employing these sciences in agriculture. To be consistent, he should object to teaching arithmetic, grammar and geography in common schools. In many arithmetics may be found examples for exercise somewhat as follows: "The head of a fish is 9 inches long, and the tail is as long as half the body, and the body is as long as the head and tail together; what is the entire length of the fish?" The *practical* man ought to say that, as well as the *head* could be measured, the entire fish might be measured, and therefore there is no use in making "a sum" about it in arithmetic, and furthermore, such sums do not occur in practical life at all events; and therefore the time and money expended in studying arithmetic is just so much thrown away—is, in fact, worse than thrown away, for the student's mind becomes filled with "*vagaries*" of this kind, and forgets the more practical and substantial duties of life. Again,

in some arithemetics, under the head of "*Miscellaneous Examples*," intended as a test of the student's proficiency in the analysis of numbers, may be found an example somewhat as follows:

A, B and C met at an inn,
  Where they grew very merry
With drinking brandy, wine and gin,
  Some glasses, too, of sherry.
At length the reck'ning they must pay
  To make all matters even;
A paid two-ninths, as poets say,
  While *B* and *C* paid seven;
As oft as *C* paid thirty cents,
  B paid the sum of fifty.
Now tell the cents each fellow spent,
  If C spent nine times twenty.

The very "*practical*" man would, at once and in disgust, withdraw his sons from school, if he learned that they were spending their time in computing the "*liquor bills*" of three worthless scamps at one of their midnight orgies. All the examples in arithmetic, without any reference to the language in which they are clothed, or the purpose to which they are applied in the book, serve simply to familiarize the student with the power and relation of numbers. There are thousands of events in every-day practical life, in which the principle or relation of numbers, assumed in the "fish" example, or in the example of "A, B and C," are involved, and on the proper analysis or solution of which much happiness or misery may depend. The difficulty with the purely *practical* man—as this term is generally understood—is that he does not discover any principle involved in any of these examples, but accepts them in their *literal* sense, and will not accept them in any other; and, if reminded that they may be regarded as illustrating a principle, he will insist that the example should express in actual and positive language the principle involved. It is for this very reason that he fails to find anything in chemistry, botany, geology or mineralogy, to assist him in his avocation. He finds, for example, in chemistry, that oxygen and nitrogen form the atmosphere; that oxygen and hydrogen form water, and that hydrogen and nitrogen form ammonia, which is excellent plant-food. He finds that he cannot mix water and air, and thus obtain the desired plant-food, and abandons chemistry in disgust. He does not stop to inquire whether ammonia might not be obtained, "ready made," in the urine of his cattle and horses in the stable, and that liquid manure is the readiest and most practical means at his command to supply plants with food. And because he does not find barn-yard manure discussed in elementary works on chemistry, thinks that manure has no chemical effect on his soil or crops.

The agriculturist requires a special education just as much if not more than any of those who engage in the "learned professions" of law, medicine or Divinity. To be eminently successful, the agriculturist requires just as precise a knowledge of chemistry, botany, physiology and geology, as the physician requires a knowledge of anatomy, physiology, therapentics and materia medica; or, as the merchant requires a knowledge of arithmetic, grammar, geography and book keeping. In an agricultural college he will learn the elements and principles of these sciences, and on an experimental farm, he will learn the pratical application of them. The college, therefore, will be a failure if there are not lands sufficient attached to it upon which every important principle taught can be put in practice upon the soil, and a competent teacher to direct the application. It is, after all, upon the experimental farm that we must rely for the acquisition of positive knowledge in farming. So far as this topic of experiments in agriculture is concerned, we can do no better than to present entire the able address of Prof. Anderson, at Stirling, in Scotland, as we find it printed in the *London Farmer's Magazine:*

When the agriculture of the early part of the century is compared with that of the present day, it is very evident that its marvellous progress must be attributed to a variety of circumstances. The increase of the population, and of the national wealth, and the growing intelligence of the people, have all tended to promote it; but their influence may be described as to a certain extent unavoidable, and they are in no degree special to agriculture, but have acted with equal force on every department of the arts and manufactures. While due weight must be given to these and other similar causes, we naturally look with greater interest to those which have exerted a more special effect on agriculture itself, and have caused it to advance with perhaps greater rapidity than any other art. This rapid progress is largely due to its having called in extraneous aid. It has applied to the mechanician to devise new implements and machines better fitted to fulfil the objects than those previously in use; to the chemist, the physiologist, and the meteorologist, to explain the natural laws on which it depends—and these branches of knowledge have brought to bear upon it the results of much laborious work—a great part of which was accumulated at a time when it was not even imagined that it could become useful to agriculture, and when the teachings of science were often considered visionary and unpractical. The farmer has not been slow to take advantage of the assistance which these sciences afford him, but has recognised the fact that his art is a complex one, founded on many branches of human knowledge, with which he may usefully co-operate in advancing it; and in this recognition of the necessity for aid and assistance, as well as for active exertion in determining their principles, lies the great guarantee for the progress of all the arts. In the early stage of their existence, those who practice them not only remain within the circle of their own knowledge, but they are content to be to a great extent passive agents, adopting, it is true, such improvements as come in their way, but rarely going out of the beaten track to seek for them, and hence that slow progress which constrasts so strikingly with the rapid development which is sure to occur when men's minds are directed to what is new.

In no art, perhaps, is the contrast between these two stages of its existence more

striking than in agriculture. The farmer of the last century was content to do as his fathers had done before him, and ploughed and manured in certain ways, because it had been the custom to do so from time immemorial. If he were possessed of superior powers of observation (a far rarer gift than is generally supposed), he noted what occurred on his own or his neighbors' farms; and if it happened that any particular operation was attended by favorable results, he adopted it in future years. It will be readily understood that, so long as this method was followed, the progress of agriculture was necessarily slow, for it depended not merely on the chance of a particular result occurring, but of its occurring under the eyes of an individual possessing the qualifications necessary to enable him to take advantage of it, and, even when thus observed, the knowledge acquired passed but slowly from man to man, and many years elapsed before it became generally known; for there was then no agricultural press to diffuse the knowledge of it over the country, and no agricultural societies in which its good effects could be discussed. Very striking is the contrast between this state of things and the active watchfulness of the modern farmer, ever on the alert for what is new, rapidly taking advantage of every step that is made, and anxious to do what in him lies to contribute to the general fund of information.

Amidst the various methods by which agriculture may be promoted, the claims of experiment have not been overlooked; and the farmer has of late years devoted much time and labor to this important means of establishing the principles on which his art depends. The introduction of experimental inquiry has indeed, in a certain sense, produced a revolution in agriculture; for it has raised it to the dignity of a science, and shown that it depends on general principles, which it is possible for the farmer to develop and establish on a sure and firm foundation. Nowhere have experiments been made with greater zeal and activity than in our own country; and we owe their number and accuracy very greatly to the fostering care of the Highland and Agricultural Society. Upwards of twenty years ago the Society commenced offering prizes for reports of experiments, and it has continued to do so ever since; and the result has been that the pages of its "Transactions" contain a larger number of careful and accurate experiments than those of any similar periodical. Every year the subject receives new attention; and the premium-book contains a series of suggestions for experiments, selected by a committee including a large number of the most experienced practical farmers, as being these which especially merit investigation, and are likely to give results useful to agriculture. Although the number of experiments made by farmers in Scotland and elsewhere is very considerable, there is no doubt they might be beneficially extended. New subjects of investigation might be undertaken; and by the adoption of a systematic plan, the value of the results obtained might be increased; and I have, therefore, thought that the whole subject might be advantageously discussed here, and the aims and objects of experiments, as well as the conditions requisite to insure accuracy, explained. I am the more induced to do this because it has been erroneously alleged that I am inclined to depreciate experimental agriculture, than which there cannot be a greater misapprehension. So far from this being the case, I have never lost an opportunity of doing all in my power to promote it. By many elaborate analysis I have sought to give completeness and precision to the results obtained in the field, and have always expressed my appreciation of the care and accuracy of those who have devoted themselves to such inquiries.

It seems to me, however, that the time has now arrived when experiments might be undertaken with wider objects than those with which we have hitherto been satisfied, and that the progress of agriculture, while it demands more minute and extensive inquiries, affords also the means of accomplishing them. It was not long since remarked

to me by a distinguished agriculturist, who has himself made many accurate and well-devised experiments, that he thought farmers had got too much into a beaten track, and went on repeating the same experiments over and over again; and in this I think there is some degree of truth; and, without undervaluing repeated experiments, the great importance of which will be afterwards pointed out, there is no doubt that new subjects of inquiry might be opened up with the effect of interesting a great number of persons, and inducing them to enter into this field of usefulness. The fact is, that from the very nature of things, the field of experiment increases every year. As our knowledge advances new subjects suggest themselves, and it frequently happens that the result of one series of experiments gives the first indication of the necessity for another, or they may show that the method which appeared well adapted to elucidate the required facts is not sufficient for the purpose, and render it necessary to throw overboard what had been done, and to commence again *ab initio*. In such a case it may seem that the labor expended has been lost, though such is really not the case, these imperfect experiments being a necessary step towards the more perfect. It must be borne in mind also that, as our knowledge advances, not only are more minute and accurate inquiries necessary, but the methods of investigation themselves improve; so that no experiments can be considered as final, but all must be repeated and revised at more or less distant intervals of time.

Without entering for the moment more fully into this question, we may set out with the position that careful and minute experiments are one of the most indispensable means of promoting both the science and practice of agriculture; and as they are very laborious, it is most important that they should be directed into the most profitable channels, and the maximum of useful results be obtained from them. In considering the matter, it may be observed at the outset that all agricultural experiments may be divided into two great classes, one set leading to *special*, the other to *general* conclusions; the first having for its object to determine particular facts, the second to establish general principles.

As an illustration of the first of these, we may take the case of experiments made by a farmer, in which he contrasts two or more manures with one another, for the sake of satisfying himself as to which it will be most profitable for him to use on his own farm. If he obtain a definite result, the immediate and tangible gain is obvious, because he is enabled to introduce a material economy by confining himself in future years to that manure which proved most advantageous. But it by no means follows that the result shall be of any use to his neighbor, for differences in the soil may effect the results; and even were they completely identical, differences in height and exposure or in the meteorological conditions may completely alter the circumstances. No doubt the case is rare in which an experiment of this kind is altogether devoid of instruction or value to other agriculturists; but very frequently an individual, when experimenting for his own benefit, may adopt a kind of inquiry very different from that which he would select if his object were the instruction of the agricultural public.

The other classes of experiments which are directed to the general advantage of agriculture have a higher aim, for they seek to establish some general principle or principles which underlie its practice, and thus enable us to generalize, as we say in scientific language—that is, enable us to draw conclusions which are not only true in a few special cases, but, if rightly used, are applicable under a great variety of apparently different conditions. Such experiments, for example, would take a manure not as a whole, but would dissect it, as it were, and selecting each of its constituents separately, would endeavor to ascertain what part of the total manurial effect it produced was due to each of them; and if this course were pursued with a variety of substances, we should in the

long run be enabled to see what result ought to be produced by any particular mixture under any circumstances. The great laws by which the action of manures is governed would thus be established—a knowledge valuable in all coming time and in every possible condition.

There is, however, a very important difference between these two classes of experiments, inasmuch as those made with a special object give an immediate answer of some kind or other, and decide, even when repeated only a few times, which is the most useful manure to employ in the particular case; while those made for the purpose of determining general principles must be frequently repeated and varied in every possible way, and may be carried on for a great number of years, and with the expenditure of much time and labor, before any conclusions whatever can be drawn from them. With such a difference it will be no matter of surprise that the majority of experiments hitherto made should belong to the former class, and comparatively few to the latter, which at first sight appear of a more abstract character, and less immediately applicable to practice. It is for this reason that the prizes offered by this society for special experiments have generally been well competed for; while those which seek to determine general laws have attracted comparatively little attention, though they are really the most important, and this is after all very natural; for every one naturally desires to see his own labors producing an immediate practical result, and looks with far less favor or gratification on the slow process of storing up facts from which no safe conclusions can be drawn until they have been accumulated during many years. Yet this patient accumulation is indispensable to the proper foundation of scientific principles. Its necessity is recognized in all the sciences, and it is very forcibly illustrated in the case of astronomy, where the observer is often compelled to wait for many years until the recurring course of events enables him to observe the facts he requires, and he is content to go on year after year amassing facts by which his successors are destined to profit.

The agriculturist is in a somewhat similar predicament. His experiments necessarily extend over an entire season, and are exposed to the disturbing effects of weather, and many other causes which, as every one knows, will tend to invalidate, or at least to effect, the accuracy of the conclusions to be drawn from them, and are often very disheartening to the experimentor. Perseverance should indeed be the motto of the agricultural experimentor. He should remember that his results are valuable in proportion to their number, for it is frequent repetition which enables him to eliminate the effect on soil and weather, and gives precision and certainty to his results.

What I have to say regarding the conducting of agricultural experiments may be divided into two parts—1st, the precautions necessary to procure accuracy, and, 2d, the mode in which experimental agriculture may be best promoted. In commencing any set of experiments, it is of primary importance that a definite plan should be laid down. The experimentor should put before himself some question or questions for solution, and should then set himself to consider carefully how his experiments may be so shaped as to give a definite answer with accuracy and precision. To secure this no precaution should be omitted, and he ought always to bear in mind that an inaccurate experiment is not only useless, but is misleading, and that the omission of some apparently unimportant piece of information may deprive an otherwise excellent experiment of half its value. Above all things, he must avoid undertaking too much. He will find no difficulty at seed-time in beginning a large number of experiments, but it is not so easy to make all the necessary weighings at harvest, when he has so many other matters to attend to. It is very desirable also that the experiments should be so arranged that they may be re-

peated during several successive years on an exactly similar plan, by which their value will be enormously increased.

Having fixed upon the particular subject to be examined, the next point is to ascertain exactly the existing state of information on it, the current opinions regarding it; and any previous experiments bearing on it should be minutely examined, by which means much labor and unnecessary repetition may be avoided. The previous experiments should be very carefully studied, and their weak points traced, so that the same errors or defects may not occur in those about to be begun. Having arranged the best mode of proceeding, it is well to consider whether the experiments about to be performed might not at the same time be made to throw light on some points not included in the original plan; or whether, by some slight modification, they might not embrace some further matter without detracting from their accuracy in relation to their primary object. These arrangements should, if possible, be made long before the time at which it is necessary to commence the experiments, so that the plan may be well digested, and nothing of importance be overlooked. The plan being arranged, the next matter for consideration is the field in which the experiment is to be made, and to this very great attention should be paid. It is of primary importance that the soil should be as uniform in quality and texture as possible. Absolute uniformity can rarely be secured, but every effort should be made to come as near it as circumstances will permit; and if the experimentor wishes to give the highest degree of accuracy to his results, he will endeavor to produce some experimental evidence of the uniformity of his soil, or of the limits within which the produce of different parts of it differ—a point in regard to which most experiments are very deficient.

Preference should always be given to a field which is perfectly flat. Undulations on the surface are generally connected with differences in the soil or subsoil, and are often due to the existence of rocks beneath the heights, which, of course, modify to a great extent the nature and quality of the superincumbent soil. On a considerable slope the soil can never be uniform, as any one may easily convince himself when the state of a ploughed field, on even a very moderate inclination, is examined after a heavy fall of rain. The furrows at the lower part of the field will then be often seen filled with matters washed down from the higher level; and what is there deposited is sometimes the coarser sandy part of the soil, the finely divided clay, which is generally its most valuable portion, having been carried off to the ditches or drains; while at other times, and more particularly when the slope is gentle, the finer particles are deposited at the bottom, and the coarser left behind. Whichever of these be the case, it is very manifest that the effect is to create a difference between the two portions of the field, which must in the course of time become considerable. When it is unavoidable to make the experiments on such a soil, the plots for the different substances should be arranged in a single row along the middle of the slope, the upper part of each being at the same distance from the top. In this way the chances are that all of them will be fairly comparable with one another; but it must never be forgotten that, though experiments in such a soil are admissible, they are open to some risk of fallacy, which can only be avoided by the greatest possible care.

The importance of uniformity of soil is so obvious that there is scarcely an experiment on record in which it is not referred to, and a statement made that the portion selected for the experiments was suitable in this respect; but it is genearlly a mere statement of a fact which we are led to infer has been determined merely by ocular inspection. But as this is liable to be fallacious, it would be infinitely preferable if some more precise method of ascertaining it were adopted. This could be readily done by deciding on the nature of the experiments and the position of the plots a year beforehand. The plots

should then be at once staked out, and the crop being raised in the usual way, the produce of each should be harvested and weighed separately; and if it proved equal in all cases, the soil would be perfectly uniform. I am not acquainted with any experiments in which this precaution has been taken—indeed, I believe it is now suggested for the first time; but there can be no doubt that the year's delay and greatly increased labor would be amply repaid by the additional value and precision of the results.

The condition of the soil is also a matter of great importance. As a rule, it may be stated that experiments are most satisfactory when made on soils which have been for some time under careful cultivation, for by this means equality of texture is most readily secured; but is advisable to avoid those which are in the highest condition, or which have been recently and heavily manured. In general, a soil which has been well worked but not highly manured is best, because on it the differences between the manures employed will be most marked.

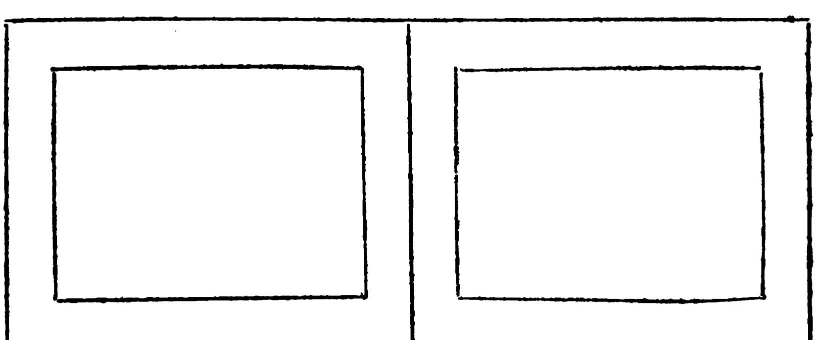
Not less important is the consideration of the size of the plots on which the experiments should be made—a subject of some difficulty, and in regard to which very great difference of opinion exists. The general impression is that the larger they are the better; and it has been held by some that no experiment should be made on less than an acre, while others have made half an acre their standard; and still smaller quantities, down in some instances to a very small fraction of an acre, have been used. It seems to me that no good general rule can be laid down for our guidance in this respect, and that much must depend on the object of the experiments, and the circumstances under which each individual investigator is placed. If, for example, the object be to grow a crop by means of different manures, and then ascertain the relative feeding values of the produce by feeding experiments on cattle, it is very obvious that no results worth having can be got except by working on a considerable scale; and even an acre may be too small a quantity to give good and trustworthy results. On the other hand, where it is merely intended to compare the weight of the produce, that quantity is unquestionably far too large.

Without undervaluing the advantages of large plots, some of which are sufficiently obvious, I have no hesitation in saying that experiments on a small scale offer great conveniences; and when made with the necessary care, are quite as accurate, if not more so, than those made on larger plots. The arguments which have been brought forward in support of large experiments are chiefly that the crop can be raised more in accordance with the ordinary methods of cultivation; that local inequalities of soil are to a great extent avoided; and that a fairer average is obtained. When small experiments are made, it is argued that, from some unexpected or unobserved peculiarity of the soil, one or more plots may be greatly superior or inferior to the others; and the result of the experiments would be to place the manures used on them in a position above or below that which they ought to occupy. It will be observed, however, that this argument proceeds on the assumption that no method other than the fallacious one of occular inspection has been used to ascertain the uniformity of the soil. If the mode of testing this point by weighing the produce of the ordinary crop in previous years, already adverted to, had been used, this difficulty would have been avoided. The fact is that, though large plots may have the advantage of eliminating any local peculiarity of the soil, they are no guarantee for its uniformity in respect to gradual changes. It frequently happens that a field is heavy at one end, and gradually shades off into a lighter soil at the other; and when this is the case, large plots are very disadvantageous, because such differences are peculiarly apt to escape detection, though they may greatly affect the results of the experiments.

Supposing it be resolved to make only five experiments on an acre each, this requires

five acres in all; and I do not hesitate to say that there is nothing more difficult than to find that quantity of soil of the necessary uniformity, and that in the great majority of cases plots of an eighth, or even a sixteenth, of this size would give much more accurate results. It is urged, also, that the crop can be more accurately weighed when the spaces are larger; but this is only because experimentors generally are content with the rude weighings which suffice for the ordinary farm purposes, while, if they used a somewhat more refined apparatus, equal, if not greater, accuracy might be secured in the small scale. The size of the plots must, in fact, be greatly influenced by the nature of the experiments to be undertaken. Where the object is merely to make what I have called special experiments, a considerable breadth of land is best; but it need never exceed a quarter, or at most half an acre—a quantity amply sufficient to give a fair average of the whole field. Where, however, the intention of the experimentor is to contribute to our knowledge of the general principles of agricultural science, much smaller quantities of land will suffice, and a twentieth, or even a hundredth, of an acre will often be sufficient. In these cases, it must be remembered that it is comparative results that are wanted; and it does not matter whether the produce from the plots be above or below the average over the whole field, provided only they be made under precisely similar circumstances, and are fairly comparable among themselves.

The main objection which may be made to small experiments is that, when the crop is one of a kind which throws out long roots, it is likely that the mutual interpenetration of the roots of adjoining plots may occur to such an extent as to interfere to some extent with the accuracy of the results. If, for example, a plot to which nothing has been applied adjoins one which has been heavily manured, some of the roots from the outer part of the former will penetrate into the latter, so that its produce will be somewhat increased; while, in the same way, the outer plants of the manured soil will stretch into the unmanured, and the difference between the produce will consequently be less marked than it ought to be. The difficulty can, however, be easily overcome by a slight separation of the plots by a sort of outer rim. If, for example, it be resolved to make the experiments, say, in a fiftieth of an acre, the space should be measured off by fortieths for manuring, while the portions actually weighed should be in each only a fiftieth of an acre in the center of each fortieth. So that the field would be arranged somewhat as in this diagram, where the inner squares represent the quantities to be weighed. Another



objection is the difficulty which is experienced in gathering the crop without overstepping the boundaries of the plots, which, when they are small, may lead to great inaccuracies. I was myself led to direct my attention to this point some years since when

engaged in examining the progress of vegetation in the wheat crop, when, from the very nature of the inquiry, it was indispensable to work on a very small scale. The plan I then adopted was to measure out the spaces with great care, and to drive firm pins, projecting about six or eight inches above the surface, into the corners, between which slender wires were stretched, so that when the produce was required it could be cut with the greatest certainty, the plants taken being always those included within the wires of each plot.

This plan has recently been adopted at my suggestion by Mr. Thomson, of Grange, Kilmarnock, who expresses himself highly satisfied with it. I am convinced, indeed, that when such precautions are taken, small experiments will be in many cases more accurate than large ones. And in this respect agriculture would only be in the position of the other sciences. In chemistry, for example, the experimentors of the sixteenth century used pounds, and those of the eighteenth, ounces, where we use grains; while there is no comparison whatever between the accuracy of the results. I am far from supposing, however, that the use of small plots makes experiments easy; on the contrary, I am satisfied that they require more care and attention to minutiæ; but a greater number can be made, and they are more rapidly performed. This latter is, indeed, a matter of great moment, because the experimentor can then superintend personally the whole operations; whereas, when the plots are large, he is almost of necessity compelled to leave a considerable part of them in the hands of ordinary farm-laborers, who cannot always be trusted to carry out with intelligence the instructions given them. There is no question at all that, if we are satisfied with small experiments, the number and variety of those performed are likely to increase very greatly. They can be carried on at a much smaller expense than large experiments; and this is no light consideration. When experiments are made on half acres or acres, the expense of the manures employed is often serious, and when a considerable breadth of land is to be taken up by them, the experimentor will naturally arrange his work so that the crop shall in all cases be remunerative, though this is not always the best condition for elucidating scientific principles. An experiment may be a failure in one sense, inasmuch as it may show that the manure used produced no practical benefit; but it may not only be no failure in a scientific sense, but may actually contribute very greatly to the establishment of some important facts. It may even be very desirable that experiments likely to give negative results should be made; but it is not to be expected that farmers will be found ready to sacrifice the produce of a whole acre, though they might not object to losing that of a smaller space.

Taking the question as a whole, I think that small experiments should be more encouraged than they have been, provided they be made with the necessary precautions, not certainly to the exclusion of large experiments—some of which it would be always advisable to conduct—but because, by giving due weight to them, we should undoubtedly induce many more persons to engage in these interesting and useful inquiries. Whether we choose to operate on a large or a small scale, it must never be forgotten that single experiments have comparatively little value, and that every result, to be trustworthy, should be made in duplicate, and it is better still if it is repeated three, or even four, times on the same soil. So great is the importance of this precaution, that it may be safely asserted that, if a person has resolved to set aside a sufficiency of land for experiments on half-acre plots with ten manures, the value of his results would be increased fifty-fold by dividing each space into four, so as to make it a four-fold experiment. When they are made in duplicate or triplicate, it is very obvious that many of the uncertainties which beset a single experiment are avoided. The risk of error from local peculiarities of soil is so far more effectual than it can be by increasing the size of the

plots, and mistakes in weighing or measuring the land and produce, which with every care must sometimes occur, are greatly diminished.

The disturbing causes which are not eliminated in this way are the effects due to the kind of soil, and to the meteorological conditions. These can only be ascertained by extending the experiments, so as to include different descriptions of soil (which may be selected in the immediate neighborhood of one another), and localities differing in their temperature and rainfall, which must almost of necessity be at some distance apart. When these matters are to be taken into account, the scope of the experiments is so greatly extended as to make them far beyond the power of an individual; and such a plan could only be accomplished by several persons in different parts of the country associating themselves together for the purpose of repeating the same experiments. To the value of such an arrangement I shall afterwards advert. Of other precautions to be taken, several must be referred to. Among others, I would particularly refer to the importance of leaving plots entirely without manure—a matter to which I should not have considered it necessary to refer had I not seen many series of experiments otherwise well performed rendered comparatively useless by this omission; and I have felt great regret that good experiments, which had clearly involved much labor, should have had their value diminished by an omission which might have been so easily supplied.

The application of the manures involves some attention. Those which are to be employed should be procured from dealers of reputation, so that their quality may be good. Before each is applied, it should be turned out of the bags on a clean wooden or stone floor, and carefully mixed with the spade, any lumps contained in it being broken down. It should then be passed through a sieve and again mixed, and a sample taken for analysis from six or eight handfuls of the stuff. The quantity required should then be weighed and mixed with once or twice its bulk of damp sand, and the whole being again passed through a sieve, it should be put into a bag ready for use. The object of mixing with sand is to admit of its uniform application, and to prevent the more dry and dusty manures being blown about by the wind during application. It is very necessary, when precise results are required, that the actual manures used should be analyzed, in order to see that they come up to the proper standard; and this precaution should never be omitted, for mistakes will occur, in proof of which I may just mention that I not long since examined a manure supplied for experimental purposes by a manufacturer of the highest standing, and stated to contain 38 per cent. of soluble phosphates, in which only 28 per cent. was found. It is scarcely necessary to observe that, had the manure been used without analysis and on the faith of its containing 38 per cent., any conclusions drawn from the experimental results would have been completely fallacious. For still greater completeness the soil should also be examined, or at all events a sample should be taken just before the experiment is begun, which may be afterwards analyzed should it be deemed necessary. For this purpose a hole should be dug to the depth of the soil, say ten inches, and from its perpendicular side a slice two or three inches in thickness should be taken. This should be repeated at five or six different parts of the field, and the whole of the soil thus taken should be carefully mixed with the spade, passed through a coarse sieve, and spread out in a thin layer on large sheets of paper for some days to dry in the air; and 5 or 6 lbs. fairly selected from this should be preserved in a tin box. It is scarcely necessary to observe that during the growth of the crop attention should be paid to everything bearing on its progress. The time at which it braids in each plot, when it comes into ear, if a cereal, and all similar events, should be carefully noted.

A knowledge of the rainfall and temperature during the time of the experiments is also of much importance, and the necessary information on these points, obtained from

any meteorological observer in the neighborhood, will generally suffice. The most perfect plan would be to have a rain guage on the field itself, and if the strength of the solar rays were also observed, the results would doubtless be most interesting; but these are refinements which we can scarcely expect to see adopted in the present state of agriculture. When the crop approaches maturity, the proper time for harvesting becomes a matter demanding much careful consideration. The general system is to collect the produce from all the crops on the same day. As far as root crops are concerned, this is probably right, because there is no definite point at which they can be said to be ripe; but it is quite otherwise with the cereals. In them the period of exact maturity should be carefully attended to; and, as the effect of some manures is to accelerate this point, it would be wrong to reap all the produce on the same day. If this be done, it is necessary either to wait till the latest plot is ripe, in which case some of the grains of the earlier ones are liable to be shed, particularly if the weather is windy; or to begin when the first is ripe, in which place the others are placed at a disadvantage.

The experimentor must, therefore, examine the crop day by day, and gather each when in the same condition as to ripeness. The crop has then to be weighed, the bulbs and tops of roots being taken separately, and the gross weight of the cereals being noted in the meantime, while the separate weights of grain and straw is left until it is convenient to thrash them. Here the experiments terminate for the year, unless it be thought necessary to ascertain the nutritive value of the produce by analysis. Where the experiments have no other object than the determination of the utility of different kinds of manures under special circumstances, this is not absolutely necessary; but where they have been made with the intention of contributing to our knowledge of the general principles of agriculture, it forms an important part of the inquiry. Suppose, for example, a set of experiments to be made by applying different quantities of ammonia to the soil, it may be a question whether a larger dose may not only increase the crop, but also yield a produce richer in nitrogenous matters. In this case, analysis is indispensable. Although the series of experiments may be considered to end here, they would still leave an important question regarding the effects of the manure unsolved. Experience has shown that in no case does the increase on the produce contain more than a very small proportion of the valuable matters contained in the manures; and if the experiments are to be exhaustive, they ought to ascertain what has become of the remainder, and what effect it will produce on subsequent crops. The determination of this point renders it necessary to weigh the produce from the same plots—to which no manure of any kind has been applied in the meantime—in the subsequent year, or, better still, during the remainder of the rotation. It is very difficult to accomplish this in a satisfactory manner, particularly with small plots; and hence the cases in which it has been attempted are very few, although the question is one of great importance, and calls loudly for investigation.

I have now discussed the precautions necessary for draining, complete and exhaustive results, in one great step of agricultural investigation; but there is another, in which the great object is to determine the nutritive value of different substances by feeding experiments on stock. Experiments of this kind are more difficult and troublesome than those into the discussion of which I have gone so fully; and time will not permit me to consider all the precautions they require. They are, however, of great importance, and offer a wide and fertile field for the agricultural experimentor. It was my intention to have entered here into some details regarding the exact kind of experiments which it is desirable should be undertaken, but I have already occupied so much time that I fear I should exhaust the patience of my audience by doing so; and I must reserve its full consideration for some future opportunity, and content myself with a very few remarks on the present occasion.

The fact is, there is scarcely a department of scientific agriculture in which experiments, embracing all the precautions and details already given, would not be valuable. Among sub-

jects particularly requiring examination, I may mention the effect of phosphates in different states. In bones the phosphates exist in an insoluble form, but they nevertheless operate very powerfully as a manure. If, however, the bones be burned, the phosphates left appear, so far as the few experiments made with them have gone, to be without manurial effect, unless they are treated with acid, and so rendered soluble. Repeated and varied experiments are necessarily due. A comparison between the action of nitrogen in the state of ammonia, and as gelatine, in which form it exists in the bones, would also be of interest. A series of experiments on the manurial effects of the salts of potash is also much required. Some years since, when discussing the alleged exhaustion of the soil of the British islands by the modern system of agriculture, I expressed the opinion that, so long as the present supplies existed, there was no probability of the ammonia or phosphates being exhausted, but that a diminution in the available supplies of potash was a possibility, though a distant one. Up to the present time we have very little information regarding the effects of potash; and what there is is conflicting. A few years ago experiments were made at my instigation with muriate of potash on the potato—a crop requiring a large amount of that alkali—and the results were very favorable; and in one case so remarkable that the gentleman who made the experiments procured a supply, and used it on a considerable scale in the subsequent year, but the results were then entirely negatives. The cause of this remarkable difference, and, indeed, everything relating to the manurial action of potash, is still to learn. The same applies to the salts of magnesia, which are sometimes used as manures for the cereals, under the impression that they must be useful because the ash of these plants contains a large quantity of magnesia.

As regards experiments in cattle, I would just observe that we are still greatly in want of a complete and exhaustive series of experiments on the relative nutritive value of swedes and common turnips. An effect of water, in promoting the fattening of stock, also merits inquiry. It has been recently expressed by a French experimentor, that when a horse was liberally supplied with water it gained weight rapidly, even when its daily rations of solid food were materially diminished. Should this be confirmed by further experiment, and found to be applicable to cattle and sheep, it would obviously be a matter of great importance to the farmer. I have now further to consider what may be done to promote the pursuit of experiment, and here it may, perhaps, be thought that the description of all that is necessary for a perfect experiment, and the numerous precautions it requires, may have rather the effect of deterring those who might otherwise wish to engage in it—and it must be admitted that good experiments do require both time and patience; but it is by no means so difficult to secure accuracy, and to attend to all these precautions, as it may appear. Any one inclined to take up experiments will find that, as in everything else the hand gets into it, and that what at first occasions a good deal of trouble becomes much simpler, and can with experience be accomplished without the effort it required at the outset. Neither should he be deterred from the good work by being in a position in which he cannot carry out all the details, for he may rest assured that experiments in which some of the precautions are omitted may still be useful, although necessarily not so valuable as those in which they are observed. This much, however, may be said, that wherever the choice lies between many experiments with few precautions and few experiments with many precautions, the latter alternative should unhesitatingly be adopted. The true plan is to undertake no more than can be well and effectually accomplished; and where a variety of results is required, it is best that several individuals should associate themselves together for the purpose. Where this is done, the results are sure to be most valuable, particul... e the same experiments are repeated on different soils and districts for several successive years, so as to elucidate the effect of disturbing causes. But when several persons unite for this purpose, it should be made a strict regulation that the experiments should be made exactly in the same manner, and that no one should be allowed to modify any of the details. I have seen instances in which the value of experiments was materially diminished in this way.

The principle of association to which I have just adverted is one of great importance to the future of experimental agriculture, and is one of the methods by which it may be most successfully promoted. As our knowledge advances, experiments must of necessity become more and more complex and elaborate, and at length require expenditure of both time and money which at no distant date will put it beyond the power of individuals to make them. The elaborate researches of Messrs. Lawes and Gilbert, which are unsurpassed for minuteness and precision, may be referred to as an example of what agricultural experiments ought to be, and of the difficuly of increasing their number, for I need scarcely say that the case is quite exceptional in which an individual has both the will and the power to expend upwards of £200 a year for many successive years in inquiries of this kind. It might be accomplished, however, if the means requisite for the purpose were raised by subscription; and this plan has been adopted by the German agriculturists, whose exertions well merit attention. There have been established for some years back in that country what are called Agricultural Experiment Stations, of which the number is considerable—I believe not less than eight or ten being in existence—supported chiefly by subscriptions, to which the Government in some instances contributes, their entire object being to carry out inquiries in various departments of agriculture. They differ considerably in extent and in the particular department of experiment they prosecute; but, as an example, I may instance that at Salzmunde, in Saxony, which is under the direction of Dr. Grouven, an able chemist, and author of a course of lectures on agricultural chemistry; it includes a laboratory, small cattle house for feeding experiments, and other necessary appliances. The cost of starting the station was between £400 and £500, and the annual expenditure about £450; but this does not include any charge for land, manure, labor, or cattle food consumed in the experiments, all of which were supplied by a neighboring proprietor free of all expense. The other experimental stations throughout the country were conducted on a similar plan, though in some instances the means are smaller, in which case, of course, the experiments are more limited. Dr. Grouven, who appears to have given much attention to the subject, is of opinion that the minimum outlay should not be less than it is at Salzmunde.

The cost of a similar institution in this country, taking into account the much greater expense of living and wages, would not be less than double what it is in Germany, or say £1,000 a year; to this must be added the cost of land, labor, &c., which I have no means of estimating, but it could not be well done under £200 or £300 a year; so that the expense of an experimental station in this country would not be less than £1,200 a year. As there are eight or ten stations in Germany, the agriculturists of that country are at the present moment expending a sum equivalent to £8,000 or £10,000 a year of our money for the encouragement of scientific agriculture. The experimental stations are doing a great deal of good work, and support a periodical, in which the whole of their labors is given to the public. We have here an example which might be advantageously followed in this country, and though it may be vain to expect, at least at present, an outlay at all equivalent to that which is made in Germany, something might surely be done. If an institution of this kind could be established in Scotland, I should myself be glad to contribute towards it both money and labor; and I am satisfied that if it were properly started, its results would in the course of time be in the highest degree beneficial to agriculture.

METEOROLOGY AND CROPS OF 1863.

As there are no meteorological statistics or reports returned to the State Board of Agriculture, we have taken the liberty to copy the following from the report of the Commissioner of Statistics:

The general results of temperature, of falling water, and of winds, for six different points, are given in the following table, viz.: Painesville,

(Mr. Storrs) Table 1; Cleveland, (Mr. Hyde) Table 2; Kelly's Island, (Mr. Huntington) Table 3; Medina, (Mr. Clark) Table 4; Portsmouth, (Mr. Engelbrecht) Table 5, and Cincinnati, (Mr. Harper) Table 6. The combined results of these tables for the year ending November 1, are as follows:

	Mean temperature.	Depth of fallen water.	Weather.		Winds.	
			Days of rain.	Clear.	Southerly.	Northerly.
Painesville	48.59 deg.	37.36 inch.	......	....	....	[illegible]
Cleveland	51.09 "	32.37 "	......	....	618	379
Kelly's Island	49.70 "	29.79 "	......	....	....	[illegible]
Medina	49.10 "	31.262 "	96	....	427	182
Portsmouth	58.57 "	30.15 "	141	107	477	399
Cincinnati	54. "	41.18 "	103	77	131	91
Mean of all	51.84 deg.	33.68 inch.	113	92	413	262

The numbers given for the days of rain and of winds, simply show the proportions—the winds being observed more than once a day, and sometimes noted in different directions on the same day.

To interpret this table properly, we must look at the averages of these places for several years:

Mean temperature,	Cleveland, 3 years	49.6	deg.
" "	Kelley's Island, 4 years	49.65	"
" "	Medina	49.	"
" "	Portsmouth	55.	"
" "	Cincinnati	53.7	"

The last two are the averages of more than twenty years of observation. The above table proves conclusively that the average temperature of 1863 was higher than the average of a series of years. The same was true of 1862.

The following is the *mean fall of water*, in inches, for several years, viz.: At—

Cincinnati	48.02 inches.
K[illegible]'s Island	27.74 "
[illegible]a..	20.474 "
Marietta	44.10 "
Steubenville	44.48 "

The average fall of water in Ohio, in 1863, being but 33.68 inches, it is very evident that it was much less than the average. At Cincinnati it was seven inches short, and at Portsmouth still more deficient. This corresponds with another fact, well known to all observers, that drouth prevailed through a large part of the State, seriously injuring most crops.

Table I.—*Meteorological Table of Cincinnati; prepared by G. W. Harper, of the Woodward High School.*

1862-3.	THERMOMETER.								BAROMETER.			RAIN.			WEATHER			WINDS.								REMARKS.
	Maximum height.	Minimum height.	Range.	Greatest daily variation.	Least daily variation.	Mean temperature of warmest day.	Mean temperature of coldest day.	Mean of month.	Maximum height.	Minimum height.	Mean height.	Depth of unmelted snow.	Depth of rain.	No. days of rain.	Clear.	Cloudy.	Variable.	N.	N. E.	N. W.	E.	S.	S. E.	S. W.	W.	
November	74	24	50	44	3	63	31	43.	29.66	28.80	29.25	.5	3.97	7	5	14	11	5	0	2	3	7	2	3	8	Indian summer.
December	68	11	57	28	6	63	22	39.	29.82	28.84	29.31	1.5	3.01	7	5	8	18	3	0	1	7	9	3	2	6	
January	60	11	49	26	1	55	14	36.5	29.74	28.63	29.22	23.5	5.55	12	3	16	12	1	2	0	5	10	4	2	7	Great snow storm.
February	60	7	53	37	4	57	11	36.	29.71	28.66	29.30	10.3	3.05	13	2	15	11	2	1	0	9	4	5	1	6	Snow storm.
March	71	20	51	32	3	63	28	40.	29.61	28.71	29.19	1.9	4.37	12	2	16	13	4	1	0	7	7	2	1	9	
April	86	24	62	31	4	70	37	53.	29.50	28.71	29.18	....	2.13	9	8	10	12	6	2	1	5	6	1	1	8	
May	91	44	47	24	5	79	47	67.	29.52	28.72	29.16	....	2.84	8	12	8	11	7	1	0	4	7	1	3	8	Drought. [showers.
June	96	55	41	23	2	86	61	71.	29.45	28.95	29.18	....	3.11	5	10	5	15	5	5	0	6	4	2	2	6	Low average temperature and heavy
July	96	61	35	24	5	86	66	77.5	29.42	29.00	29.18	....	3.21	7	6	5	20	8	3	2	2	4	1	2	9	From 12th to 17th, inclus., very cool.
August	94	45	49	23	4	84	51	72.	29.54	29.01	29.27	....	2.994	9	8	5	18	6	1	1	4	6	3	3	7	Cool weather.
September	92	38	54	30	4	79	44	65.	29.61	28.95	29.37	....	3.10	6	8	7	15	4	2	4	6	7	3	3	1	
October	75	30	45	24	4	67	36	49.	29.65	28.84	29.26	....	3.85	8	8	9	14	8	2	1	5	4	3	3	5	Low average temperature.
	Average							54.				37.7	41.184													

OBSERVATIONS.

Greatest height of thermometer during the year was	....	96°
Least " " "	....	7°
Range " "	....	89°

During the 14th and 15th of January, there was one of the heaviest snow storms ever witnessed in this vicinity. The average depth of snow was over twenty inches, which was not only the greatest amount I have ever measured at one time, but the greatest I have ever measured during an entire winter. On the 5th of February, there was another severe snow storm, during which over eight inches fell. The winter of 1862–3 was very mild, the thermometer having a range of only sixty-one degrees. The depth of snow, over three feet, is an amount unprecedented at this place. The month of May was very dry. From the 5th to the 26th, there fell less than one-tenth of an inch of rain. The average temperatures of June and October were the lowest I have ever recorded for those months. The last week of August was the coldest ever experienced at this place during that month. On the morning of the 30th, the thermometer stood at 7 o'clock at 45 degrees, by far the lowest recorded observation ever made at this place at that time in the year. GEO. W. HARPER, A.M.

NOTE.—The barometrical observations were made at a height of 303 feet above low water in the Ohio river, or 638 feet above the ocean. They are all reduced to the freezing point and for capillarity.

TABLE II.—*Meteorological Observations made at Portsmouth, Ohio. Latitude 38 deg. 45 min. Longitude 82 deg. 50 min. Height above sea, 537 feet.*

1862-3.	THERMOMETER.								BAROMETER.			RAIN.			WEATHER.			WINDS.							
	Maximum height.	Minimum height.	Range.	Greatest daily variation.	Least daily variation.	Mean temperature warmest day.	Mean temperature coldest day.	Mean of month.	Maximum height.	Minimum height.	Mean of month.	Depth of snow.	Depth of melted rain and snow.	No. days rain.	Clear.	Cloudy.	Variable.	North.	South.	East.	West.	N. E.	S. E.	N. W.	S. W.
October*	88	40	48	20	1	80.02	45.	62.28	29.87	29.22	29.28	2.	1.10	10	14	9	8	8	1	16	6	15	15	17	19
November*	69	42	27	15	1	61.02	43.02	51.01	29.96	29.10	29.53	1.	2.	9	9	11	10	4	..	3	9	13	7	18	23
December*	63	32	31	15	0	58.02	38.	47.10	30.01	29.01	29.70	1.	1.55	12	13	7	11	6	1	4	6	6	15	27	27
January*	62	26	36	13	1	54.02	31.01	45.15	30.04	28.88	29.50	9.	5.55	14	7	12	12	5	2	4	8	16	19	16	29
February*	64	25	39	17	1	59.61	27.02	42.24	29.98	28.98	29.57	7.50	3.40	12	3	11	14	3	1	11	10	21	24	14	29
March*	68	36	32	16	1	60.02	42.01	48.88	29.80	29.10	29.47	1.25	5.50	13	8	14	9	7	..	9	11	15	8	24	26
April†	78	27	51	36	4	68.02	36.01	63.89	29.76	28.98	29.548	......	1.40	14	9	14	7	7	..	6	7	21	8	14	20
May†	84	50	34	22	4	74.01	52.02	66.46	29.78	29.13	29.499	......	.80	13	14	8	9	3	1	8	15	6	16	11	33
June†	94	50	44	29	1	82.	60.02	70.65	29.72	29.52	29.40	......	1.05	11	6	12	12	5	3	6	23	1	11	10	31
July†	94	59	35	18	2	82.02	66.02	76.31	29.67	29.40	29.53	......	3.60	12	5	11	15	19	5	2	19	7	11	6	20
August†	91	47	44	20	1	82.	54.02	74.49	29.84	29.39	29.60	......	3.00	13	8	13	10	12	2	3	24	7	5	7	32
September†	85	39	46	27	3	76.1	50.2	65.21	‡29.77	‡29.20	‡29.53	......	1.20	8	11	6	13	8	6	3	24	11	8	9	19
	....	....	....	....	....	......	......	58.57	......	......	....	21.75	30.15	..	......	......	......	..	..	..	..	..	..	..	..

* Observations taken at 7.12.6.
† Observations taken at 7.2.9.
‡ Reduced to freezing point.

L. ENGLEBRECHT.

Table III.—*Meteorological Observations taken at Medina, Ohio, for the year ending Oct. 31, 1863, by William P. Clarke, A. M. Latitude 41 deg. 7 min. N.; Longitude 81 deg. 47 min. W. Height above the sea, 1,255 feet.*

Month.	Barometer.				Thermometer.								Rain and snow.						Prevailing winds.				Remarks.
	Maximum.	Minimum.	Mean.	Range.	Maximum.	Minimum.	Range.	Monthly mean.	Coldest day.	Mean of coldest day.	Warmest day.	Mean of warmest day.	Number days of snow.	Days of rain and snow.	Depth of snow.	Days of rain.	Stormy days.	Depth of rain and melted snow.	Direction.	No. of times.	Direction.	No. of times.	
1862—November	29.162	28.199	28.639	.963	67.	27.	40.	38.9	23	26.8	1	58.3	6	..	6.5	8	14	3.129	S.	16	S. W.	30	
December	29.205	28.197	28.683	1.108	58.	9.	49.	33.7	20	13.3	14	55.5	7	1	10.6	7	13	3.950	S.	15	S. W.	29	
1863—January	29.165	27.967	28.622	1.198	52.	4.	48.	31.3	17	10.2	3	45.3	10	3	26.5	11	18	5.277	N. W.	13	S. W.	37	Very wet.
February	29.175	28.089	28.718	1.086	49.	3.	46.	25.5	3	5.8	26	46.3	11	2	17.9	6	15	3.055	S. E	22	S. W.	28	3d. Coldest day of the year.
March	28.993	28.192	28.605	.801	55.	7.	48.	32.4	13	14.3	23	57.7	13	3	15.9	8	19	2.961	S. W.	25	N. W.	18	Stormy.
April	28.940	27.968	28.623	.972	72.	16.	56.	44.4	4	26.7	11	65.2	2	1	32.	8	9	.738	N.	23	N. W.	22	Pleasant.
May	28.936	28.137	28.593	.729	83.5	40.	43.5	62.1	14	51.3	22	77.	..	..	....	10	10	1.796	S. W.	41	N. W	17	
June	28.841	28.224	28.642	.617	89.	48.5	57.5	63.3	6	53.2	15	75.2	..	..	....	8	8	1.852	S. W.	23	N.	18	7th. Frost in the morning.
July	28.873	28.464	28.611	.409	85.	54.	31.5	68.1	16	56.8	3	78.5	..	..	....	8	8	1.302	S. W.	29	N. W.	23	Dry. Variation of barometer slight.
August	28.953	28.400	28.692	.553	89.	50.5	38.5	72.4	29	52.7	2	81.3	..	..	....	9	9	2.752	S. W.	48	N. E.	15	2d. Hottest day of the year.
September	29.060	28.412	28.792	.657	82.5	39.	43.5	61.	25	42.2	17	72.5	..	..	....	4	4	2.380	S. W	39	N.	14	20th and 25th. White frost.
October	29.104	98.294	28.675	.810	69.	32.5	36.5	48.4	25	37.8	1	63.8	..	..	....	9	9	2.070	S. W.	45	N. E.	19	23d. Frost killed vines.
Means	......	......	28.589	......	....	....	....	49.1	..	....	..	....	..	..	....	..	....	......	......	..	......	..	
Totals	......	......	......	......	....	....	....	....	..	....	..	....	49	10	80.6	96	134	31.262	......	..	......	..	

TABLE IV.—*Abstract from Meteorological Journal kept at Kelley's Island, Ohio, by George C. Huntington. Lat.* 41 *deg.* 35 *min.* 44 *sec. North, Long.* 82 *deg.* 42 *min.* 32 *sec. West. Height of cistern of barometer above tide-water,* 587 *ft.*

	THERMOMETER.								BAROMETER.					
	Mean temperature at 7 A. M.	Mean temperature at 2 P. M.	Mean temperature at 9 P. M.	Mean temperature of the month.	Highest degree.	Lowest degree.	Range for the month.	Temperature of Lake Erie last day of month.	Mean of month.	Maximum.	Minimum.	Range for the month.	Snow in inches.	Rain and melted snow in inches.
									Inch's	Inch.	Inch.	In.		
1862—December..	32.74	38.29	34.16	34.39	72	16	56	....	29.342	29.91	28.91	1.00	3¼	4.71
1863—January ...	30.64	34.58	31.87	32.63	47	11	36	....	29.275	29.77	28.70	1.07	5½	3.04
February ..	25.39	32.43	29.18	29.00	26	2	24	....	29.378	29.79	28.81	0.98	18¾	2.62
March......	29.09	35.61	31.29	32.00	51	17	34	....	29.282	29.64	28.87	0.77	6¼	1.51
April	40.40	47.33	41.37	43.03	64	17	47	47°	29.312	29.64	28.68	0.96	....	1.98
May	56.68	66.13	56.97	59.92	84	40	44	62°	29.297	29.58	28.87	0.71	....	2.12
June........	63.70	72.16	63.67	66.51	86	52	34	70°	29.322	29.55	28.94	0.61	....	3.00
July	69.03	76.32	68.90	71.42	88	56	32	74°	29.334	29.55	29.15	0.42	....	1.43
August	70.06	76.81	69.61	72.16	89	52	37	72°	29.396	29.64	29.10	0.54	....	1.74
September .	59.23	67.73	60.43	62.46	85	42	43	64°	29.434	29.75	29.10	0.65	....	1.29
October....	47.16	54.19	49.06	50.14	70	39	31	49°	29.376	29.76	28.93	0.83	....	2.84
November .	40.07	46.60	42.53	43.07	59	19	40	40°	29.308	29.69	28.95	0.74	....	3.51
													33¾	29.79

SUMMARY FOR THE YEAR ENDING NOV. 30, 1863.

Mean temperature at 7 A. M. .... 47.01°
Mean temperature at 2 P. M. .... 53.85°
Mean temperature at 9 P. M. .... 48.25°
Mean temperature of the year, from 1,095 observations.................... 49.70°

It is found, from actual observations continued through long periods, that if the temperature is recorded daily at 7 A. M., 2 P. M., and 9 P. M., the resulting mean temperature is nearly identical with that found from observations made every hour during the twenty-four; consequently the mean temperature, as deduced from these three daily observations, is considered sufficiently accurate for all practical purposes.

Highest temperature recorded at regular hour, Aug. 5, 2 P. M., 89 deg.
Lowest temperature at regular hour, Feb. 3, 7 A. M., 2 deg.
Extreme range for the year, 87 deg.
Warmest days, July 3d and August 5—mean temperature, 80.33.
Coldest day, February 3d—mean temperature, 7.33 deg.
Latest frost in spring, April 3.
Earliest frost in autumn to injure vegetation, Nov. 9th.

Barometer—Maximum height, Dec. 10th, 11 A. M.	....	29.91	inches.
Minimum, April 2d, 7 A. M.	....	28.68	"
Extreme range	....	1.23	"

Amount of snow in inches, 33¼

Amount of water from rain and melted snow, 29.79 inches.

I have, in a former communication, alluded to the very great degree of uniformity in the mean annual temperature of any given place, as found from observations, continued for a long period, in various places, and I now add a few notes from my journal, tending to show, that in this locality the same results are observed in a very marked degree. These notes would be entitled to no particular consideration, if the facts were confined wholly to this section of country, but as corroborative of observations made by various individuals, in different and widely distant parts of the country, they may be deemed worthy of a place in this communication.

Mean temperature of the year ending Nov. 30, 1860	49.54	deg.
" " " " 30, 1861	49.51	"
" " " " 30, 1862	49.76	"
" " " " 30, 1863	49.70	
	4)198.51	
Mean temperature of four consecutive years, 49.62¾—or say	49.63	
Coldest year in four—mean temperature	49.51	
Which is but twelve hundredths of one degree below the mean	.12	

Warmest year in four—mean temperature, 49.76—which is but thirteen hundredths of one degree above the mean of four years.

Difference between the coldest and warmest year in four, is twenty-five hundredths—or one-fourth of one degree.

Again: If we put it in a different shape, and end the year on the 31st of March, instead of 30th November, we have the following results, viz:

Year ending March 31st, 1860—mean temperature		49.40	deg.
" March 31st, 1861—	"	49.38	"
" March 31st, 1862—	"	49.60	"
" March 31st, 1863—	"	50.20	"
		4)198.58	
Mean temperature of four years ending March 31st, 1863		49.64½	

Here we have the same mean temperature within fifteen thousandths of one degree; but the extremes are somewhat different. The coldest year in four is twenty-six hundredths of a degree colder than the mean of four years, and the warmest year is fifty-five hundredths of a degree warmer

than the mean; and the extreme difference between the coldest and the warmest year is eighty-two hundredths of one degree. If we take a period of ten years, instead of four, the result would be found not materially different.

In view of these facts we may assume the mean temperature of any place, as deduced from regular observations continued through ten consecutive years, to be, for all practical purposes, a fixed quantity, and make our estimate accordingly.

But, it may be asked, of what practical importance is it, if these are established facts? The question is best answered by a practical illustration. We have had for months through the newspapers prophecies to the effect that the coming winter will be one of unusual severity. These prophecies are based upon what are said to be the instincts or intuitions of some sagacious animals, which are said never to fail. We are told that the beaver, the muskrat, and some other animals, have made unusual provision for the coming winter in the building and storing their habitations. Again, it is said by the farmers, that the ears of corn are enveloped in an unusually thick covering of inner husks. This, too, is said to be a never-failing sign of a cold winter.

Now, if these prophecies hold good, they will be at variance with what we think the legitimate deductions from observed facts. In the first place, we have seen that the mean temperature of this locality will not differ materially from 49.63 deg.; this gives an aggregate of mean, for the twelve months—

Of	595.56
The aggregate of mean for the eleven months ending with Nov. 30th, is found, by observation, to be	562.07
Leaving, for the mean temperature of December, 1863	33.49

It may be a little above or a little below this; but the difference, whatever it is, will be compensated in a great measure by the first of April, as will be seen when our estimates are completed. For, if we take another view of the case, and end the year with March 31st, instead of November 30th, we have the following results:

Say aggregate of mean for twelve months ending March 31st	595.56
Aggregate of mean of eight months—say from April 1st to December 1st, as obtained from observations	468.71
Leaving for the aggregate means of Dec., Jan., Feb. and March	126.85

or a mean monthly temperature of 31.71.

This does not preclude the possibility of some severe weather, but in this case we shall have warm weather enough to bring the mean very near,

I think, to the above figures. It is not pretended that by this method we can always tell exactly what the temperature will be a month in advance, but we can probably make a much nearer approximation to the truth than by any system of blind *guessing*. There is in this method one chance for error which will readily suggest itself. For instance, in our table of means ending March 31, we find the warmest year in four is fifty-five hundredths of a degree warmer than the mean of four years. Now, if the whole of this difference is thrown into one month, it will make a difference in that month of something over six degrees, which would throw doubts on the reliability of the plan. Although this is possible, it is by no means probable; and if we allow one-half of this difference for one month, it will reduce it to about three degrees, as the probable limit of error. In practice I have found these estimates, in the great majority of cases, within one or one and a half degrees of the truth—oftentimes less than one degree. It is proper to observe, however, that greater accuracy is insured by taking into account the mean temperature of the given month for a number of years—some months being much more variable than others. This may make it necessary to modify somewhat the result of the first calculation.

I have extended this communication much beyond the limits I intended; but if it shall have the effect to call the attention of my brother observers to these matters, my object will be attained, and we may, by united action, in time, reduce some of the laws governing temperature to something like science.

GEO. C. HUNTINGTON.

KELLEY'S ISLAND, O., Dec. 10, 1863.

TABLE V.—*Meteorological Register for the year ending November 30th, 1863; kept at Cleveland, Cuyahoga county, Ohio, by Gustavus A. Hyde. Monthly mean from daily observations.*

MONTH.	ANEROID BAROMETER, 643 feet above the sea. Reduced to freezing point.						TEMPERATURE.						Snow.	Rain and melted snow.	WINDS. The relative value of each course of wind, for each month, is represented in hundredths.								
	7 A.M.	2 P.M.	9 P.M.	M'nthly mean.	Maximum.	Minimum.	7 A.M.	2 P.M.	9 P.M.	M'nthly mean.	Maximum.	Minimum.			N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.	Prevailing winds.
	Inch's	Inch's	Inch's	Inch's	Inch's	Inch's	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	In.	In.									
December, 1862	29.369	29.291	29.307	29.306	29.840	28.870	34.50	38.82	37.23	36.85	60½	14	4.3	3.60	7	5	1	7	34	17	17	12	Southerly.
January, 1863	29.268	29.230	29.268	29.255	29.800	28.760	31.61	36.27	34.50	34.13	55	7	18.1	3.87	5	11	3	12	39	12	12	6	Southerly.
February	29.375	29.355	29.371	29.367	29.820	28.760	27.59	33.55	31.93	31.02	49	8	18.6	2.87	12	14	5	20	21	6	16	6	Southerly.
March	29.251	29.253	29.288	29.264	29.640	28.840	31.08	37.78	33.82	34.23	62	19	14.0	2.85	6	13	10	6	24	9	16	16	Southerly.
April	29.263	29.257	29.265	29.261	29.580	28.660	42.90	48.38	45.67	45.65	75½	20	1.5	0.98	19	24	..	15	14	3	13	12	Northerly.
May	29.251	29.240	29.236	29.242	29.570	28.820	58.24	65.66	61.93	61.94	83	42	....	3.07	6	21	2	21	13	12	15	10	Southerly.
June	29.241	29.227	29.237	29.235	29.480	28.880	62.55	70.68	66.03	66.42	86	53	....	2.24	12	14	2	29	14	4	15	10	Southerly.
July	29.251	29.243	29.247	29.247	29.480	29.050	68.79	75.34	72.48	72.20	84	57	....	1.65	17	15	3	22	21	2	10	10	Southerly.
August	29.305	29.287	29.297	29.296	29.570	28.990	69.35	78.13	72.40	73.29	92	49	....	2.06	9	15	2	28	13	12	10	11	Southerly.
September	29.358	29.335	29.347	29.343	29.680	28.990	56.92	68.67	62.03	62.54	86	40½	....	2.63	16	18	1	35	15	8	5	2	Southerly.
October	29.312	29.294	29.305	29.304	29.700	28.890	46.02	55.27	51.10	50.82	74	34	....	2.53	3	7	5	27	24	13	16	5	Southerly.
November	29.259	29.231	29.253	29.248	29.680	28.900	40.96	47.26	43.00	44.02	67	18	13.0	4.02	1	1	2	8	39	19	22	8	Southerly.
Mean for the year.	29.288	29.270	29.285	29.281	29.840	28.660	47.54	54.65	51.09	51.09	92		69.5	32.37	113	158	36	230	271	117	167	108	Southerly.

TABLE VI.—*Extracts from the Meteorological Journal kept at Painesville, Ohio, by J. Storrs, for* 1863.

Mean temperature of the winter months					31° 13'
"	"	"	spring	do	45° 28'
"	"	"	summer	do	67° 85'
"	"	"	autumn	do	50° 13'

Mercury fell the lowest on the 18th of January, 7° above 0; and the 13th of March mercury the same, 7°. Mercury highest August 9th, 90°.

You will see we had a mild winter, mercury not touching zero by 7°. In summer it seldom rises higher in this section (2 miles from lake) than 90°, on account probably of the lake breezes. Our coldest weather is usually in February.

Whole amount of rain and melted snow:

In the winter months		5.75	inches.
"	spring do	7.18	"
"	summer do	9.81	"
"	autumn do	14.62	"
Making a total of		37.36	inches.

December of this year not being included in the above. The most remarkable feature in the present year was the frosts of August and September; the first occurring August 30, injuring corn on lowlands, and the second frost on the 26th and 27th of September—the last hard enough to kill all tender plants, and greatly injuring corn that was not ripe or cut up. A frost in August has not occurred here before, it is believed, since the settlement of the country; and it is very unusual to have a frost here till about the 20th of October, or the 1st of November.

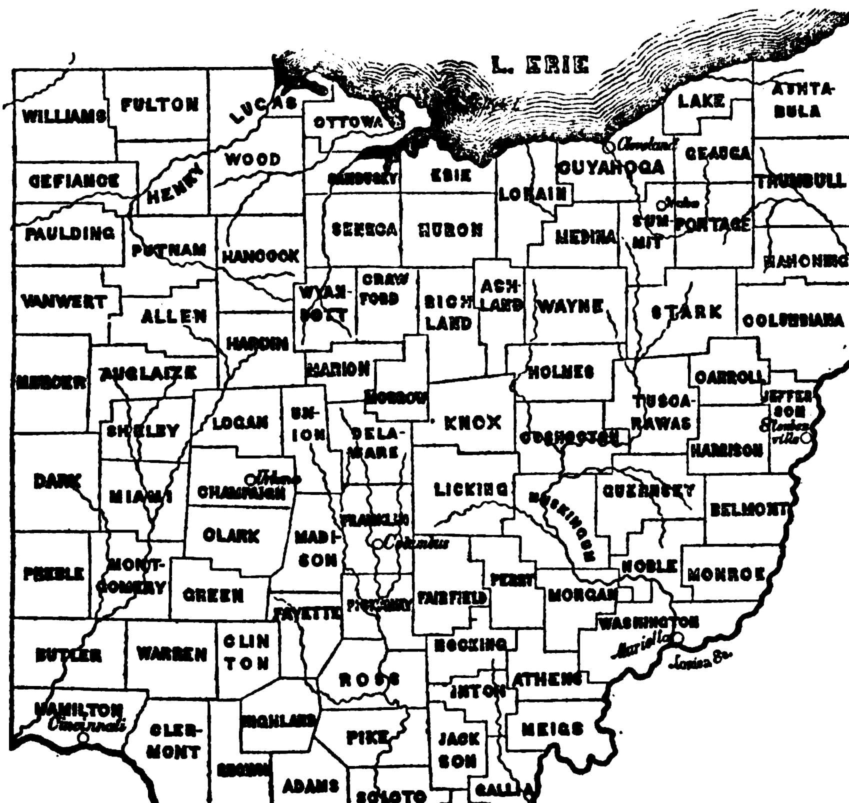
The season has been favorable for most crops. The rains were light in May and June, and the hay crop in consequence was lighter than usual; winter wheat a fair crop; corn much below the average, in quantity and quality; oats middling; potatoes very fine, and fair yield; barley a good crop. All the smaller fruits were good. Apples not plenty—trees bore too excessive in '62, and did not blossom much last spring; about a medium crop of peaches.

The cultivation of peaches, pears, and grapes is greatly increasing. Our warm, sandy and gravelly ridges are well adapted to the culture of fruit, and yield large profits to the grower.

STATISTICS OF CROP RETURNS.

In the Ohio Agricultural Report for 1859 we gave a "*History and Review of the Condition of Agriculture in Ohio*," in which the more homogenous portions of the State were classified as valleys. It is proposed to retain the same classification in relation to the crops of 1863. These valleys are:

The MIAMI, embracing the counties of Butler, Brown, Clarke, Clermont, Champaign, Clinton, Darke, Greene, Hamilton, Logan, Miami, Montgomery, Preble, Shelby and Warren. This group of counties contain the Great and Little Miami and the Mad Rivers and all their tributaries, and forms a natural hydrostatic basin, in which it is reasonable to suppose that the soil is of more uniform quality, the meteorological phenomenon more identical, than if some other system of division or grouping had been adopted.



From 1850 to 1858 the amount of crops of wheat and corn only were required to be returned to the Auditor of State and published in the Agri-

cultural Report; in 1858 the crops of rye, barley, buckwheat, oats, and meadows were added to the list; butter, cheese, stone-coal and pig-iron in 1860; in 1862, sorgho, flax and maple sugar were added; and finally, in 1863, tobacco and clover were added. The correctness of the returns made of crops has been doubted by many very excellent citizens of the State, and held by them as mere "guess work." No doubt they are not *precisely* correct in every respect, but they have one merit at least, and that is, that they have been very uniform; when there is a good crop it never fails to be indicated in the returns, and a poor one is equally certain to do the same. It has been argued that a fear of taxation on the part of farmers induces them to withhold a portion which should be returned. If this were generally true, then the returns to the State Auditor should differ more widely than they are found to do from the census returns. Upon the whole, we are inclined to believe that the crop returns, as made in the State of Ohio, are as nearly correct as the returns of merchandise, capital invested in trade or manufactures, and much more reliable than the returns of personal property generally.

The crop returns, as usually published, present nothing more than "dry columns of figures," and the reader, if interested in them at all, will glance at the aggregate, and proceed to some other subject. But these statistics are the only statements to which we can refer to prove our condition agriculturally; and many important as well as interesting facts are contained in these "dry columns of figures," as will be manifest in the course of this article. For several years past we intended to analyze these crop returns, and show what they really embraced, but the returns made by the County Auditors to the State Auditor have been so tardy as not allow proper time to do so before the time of publication. In order to remedy this defect, in part, and to secure additional statistics, the Legislature, at its last session, passed the following law, and which was at once forwarded to the County Auditors:

STATE AGRICULTURAL ROOMS,
OHIO STATE BOARD OF AGRICULTURE,
COLUMBUS, O., May 25th, 1864.

Auditor of ——— County:

DEAR SIR: The Legislature at the last session passed the following law:

AN ACT

In relation to statistics of agricultural and mineral products.

SECTION 1. *Be it enacted by the General Assembly of the State of Ohio,* That it shall be the duty of the several township assessors in all the counties in the state, at the time of making the annual assessment of personal property for taxation, to collect the following items of statistics in addition to those already authorized by law, viz:

First—The number of acres grown in clover, the number of tons of hay made from it, the number of bushels of seed obtained, and the number of acres of clover plowed under for manure.

Second—The number of acres planted in tobacco, and the number of pounds obtained.

Third—The number of (old and young) dogs, both male and female.

Fourth—The number of tons of pig-iron manufactured, and the bushels of stone-coal dug.

Fifth—The number of acres sown in flax, number of pounds of fibre gathered, and the number of bushels of seed obtained.

Sixth—The number of acres planted in sorgho, the number of gallons of syrup manufactured, and the number of pounds of sugar obtained.

Seventh—The number or pounds of maple sugar made, and the number of gallons of syrup manufactured.

Eighth—The number of pounds each of butter and cheese manufactured.

Ninth—The number of acres planted in potatoes, and the number of bushels obtained; and make a correct return thereof to the county auditors of their respective counties at the same time that a return of the enlisted property is made.

SEC. 2. That it shall be the duty of the county auditors to forward annually on or before the first day of June, to the office of the Ohio state board of agriculture, the aggregate of each of the items of statistics enumerated in the first section of this act, together with the aggregate of each and every item of statistics of acreage and product, where acreage is enumerated, and the aggregate of product where no acreage is enumerated, of all the agricultural statistics by law authorized to be returned to the auditor of state; together with the aggregate number and value of the horses, cattle, sheep and swine in the county, as sent to the office of state auditor.

SEC. 3. This act to take effect from and after its passage.

JAMES R. HUBBELL,
Speaker of the House of Representatives.
CHARLES ANDERSON,
President of the Senate.

February 20, 1864.

Accompanying this I send you a proper blank in which to place the aggregate of each statistical item. You will please fill up the blank properly, and forward to me in the accompanying envelope by the time prescribed by law, and much oblige,

Yours, respectfully,
JOHN H. KLIPPART,
Corresponding Sec'y Ohio State Board of Agriculture.

But even this did not have the desired effect, for one county (Trumbull) made no return until the 3d of November, at which time the printing of this entire report was almost completed, therefore allowing very little time in which to prosecute the contemplated analysis.

During the year 1863 crops were harvested from 6,465,279* acres of land in the aggregate of the State, or, in other words, about one-fourth of the area in the State was in crops in 1863.

In 1860 there were, according to the report of the Board of Equalization which met in 1859,

Acres of arable or plow land	9,351,921
" meadow or pasture	3,754,024
" uncultivated or woodland	12,210,154
Total taxable acres in the State	25,316,099

* In the statement on page XIX, in the column for 1863, one county is omitted.

The crops of 1863, as returned to this office, were gathered from about one-half of the "cleared lands" in the State. But it by no means follows that the other half is fallow. In the non-returned half are orchards, vineyards, pastures, and small crops. A portion of it, certainly, is fallow.

MIAMI VALLEY.

The lower portion of this valley rests directly upon the Silurian lime-stone formation, and the upper portion upon the Corniferous lime-stone. In the immediate vicinity of the Miami and Mad rivers the soil contains the shells of many species of fresh water mollusca in a state of disintegration. These shells will furnish lime to the soil for many years to come; the soil is deep, and an additional inch to the usual depth in plowing produces a very marked effect upon the succeeding crops.

The following statement shows the agronomic condition of the valley. Its population per square mile exceeds that of any other valley in the State; but it must not be forgotten that Cincinnati, the Queen City of the West, is situated in it, and in which is concentrated fully one-fourth of the entire population of the valley:

TABLE NO. I.

Amount of square miles of area	7,500
Amount of acres of plow or arable land	2,013,803
" " meadow or pasture land	445,789
" " woodland or uncultivated land	1,682,800
Total acres for taxation	4,142,400
Amount of acres in crops, 1863, measured by the bushel*	1,192,762
" " bearing other crops†	228,891
Total acres in crops in 1863	1,421,553
Per cent. of the valley in crops in 1863	34.3
Miles of railroad	801
Square miles of area for one mile of railroad	9⅓
Population in 1860	606,307
Population per square mile	80.84
Acres to each inhabitant in 1860	6.83
Acres in crops in 1863, to each inhabitant in 1860	2.34
Bushels in 1863, per acre	22.01
Bushels in 1863, to each inhabitant in 1860	43.23

From this it will be seen, that if the entire area of the valley was in a state of cultivation, and estimating to each individual the same number of acres in

* Wheat, rye, barley, buckwheat, corn, oats, flax-seed, and potatoes.

† Tobacco, sorgho, clover, and meadow.

crops as in 1863, then the valley could contain 1,772,829 inhabitants and the industrial product *per capita* remain the same as at present. From the number of miles of railroad in comparison with square miles of area, it will be seen that this valley enjoys more facilities for the shipment of surplus products than any other equal portion of the State.

	Square Miles.	Miles of Railroad.	Railroad to Square Mile.	Acres.	Acres to 1 mile of Railroad.
Miami Valley	7,500	801	1 to 9⅜	4,800,000	6,000
Scioto "	7,500	268	1 to 28	4,800,000	17,910
Muskingum Valley	8,128	464	1 to 15¼	5,202,059	9,723
Maumee "	7,500	527	1 to 14¼	4,795,879	9,100
Hocking "	3,466	167	1 to 20¾	2,218,216	13,282
Western Reserve	5,288	527	1 to 10	3,384,350	6,422
River counties	1,907	172	1 to 11	1,220,729	7,097
State at large	40,000	3,000	1 to 13⅓	26,401,233	......

In the annexed table is a detailed statement of the specific crops returned, together with the acreage, aggregate product, and product per acre. The fourth column shows the per centage or proportion of area in bearing in each particular crop. Thus, it will be observed, that 32.40, or nearly 33 per cent. of the entire area in crops was devoted to wheat, nearly 37½ per cent. to corn, and less than 10 per cent. was in meadow. From this we naturally infer that comparatively little grazing is done here.

Table No. II.—Products of 1863.

	Acres.	Bushels.	Product per acre.	Per centage of acres bearing crops, in 1863.	Per centage of crops in the State, grown in the valley.	Per centage of land in the Miami Valley, in crops, in the State in 1863.
Wheat	460,680	5,678,468	12.33	32.40	27.31	25.24
Rye	4,195	54,137	12.90	.29	17.20	12.99
Barley	29,435	601,624	20.45	2.17	45.55	39.88
Buckwheat	5,325	118,026	22.13	0.37	37.10	19.25
Corn	532,513	16,049,286	30.12	37.65	29.47	25.45
Oats	102,918	2,394,233	23.27	7.24	21.16	18.08
Flax	38,413	257,932	6.71	2.72	41.32	40.31
Potatoes	19,283	1,094,175	56.75	1.36	20.12	23.90
	1,192,762	26,247,881	22.01			
Tobacco	21,746	18,591,008 lbs.	885.1	1.53	53.80	44.18
Sorgho	6,595	453,477 galls.	68.75	0.46	19.57	19.82
Clover	59,559	37,397 tons.	0.62	3.32	12.51	15.37
Meadow	140,891	136,741 "	0.97	9.9	12.71	11.76
Clover Seed	......	......	0.20	......	7.98	......
Flax Fiber	......	......	152.7	......	14.88	......
Butter	......	4,534,470 lbs.	....	......	14.51	......
Cheese	......	93,674 "	....	......	0.49	......
Maple Sugar	......	1,192,905 "	....	......	17.66	......
Maple Syrup	......	133,056 galls.	....	......	29.62	......

Notwithstanding the fact that this valley, in 1863, produced more than one-half of the tobacco grown in the State, yet it employed no more than 1½ per cent. of the area in crops, or about one-half of one per cent. of the entire area; that is, in other words, about half an acre in one hundred.

This fourth column solves another very important problem, namely, what relative proportions of one hundred acres of cleared and tillable land are put in the several kinds of crops. Whether the farmers in this valley have adopted the system of growing such crops only as are most successful on each individual farm; or whether they have by experience learned which is the best relative proportion in which to grow crops; in either event the valley taken as a whole shows that a farmer having one hundred acres to put in crops, divides them as follows, viz:

	Acres.		Acres.		Acres.
Wheat	32.40	Oats	7.24	Clover	3.32
Rye	.29	Flax	2.72	Meadow	9.90
Barley	2.17	Potatoes	1.36		
Buckwheat	.37	Tobacco	1.53		——
Corn	37.65	Sorgho	.46		100.

And the next table will show that, in addition to these crops, nearly 11 head of horses, almost 17 head of cattle, 31 head of sheep, and 81 head of swine are kept on the same 100 acres. The amount of horses is considerably above the normal average, owing to the large number of horses in the city of Cincinnati; probably 4 or 5 horses are as many as *really* are kept on the farm of one hundred acres of cropping land.

The fifth and sixth columns exhibit respectively the proportion of the entire crop of the State which is grown in the valley, and the proportion of the land in crops in the State in each particular crop in the valley. Thus, the Miami valley produces 27 per cent., or more than one-fourth of all the wheat produced in the State in 1863, on just one-fourth the amount of land in wheat in the State. This proves that the wheat crop in the valley is fully 2 per cent. more than an average yielded in other portions of the State. About 40 per cent. of the area in barley in the State, is grown in the valley, and yields nearly one half (45½ per cent.) of the barley grown; this shows that either the barley crop is well adapted to the soil of the valley, or else the farmers here understand how to grow it successfully—better than their co-laborers elsewhere do. Neither clover nor meadow crops appear to have done as well in the valley as elsewhere, because there is a greater proportion of the area in these crops in proportion to their products than in some other valleys. Corn, rye and tobacco appear to be well adapted to this valley, but potatoes do not do so well; one-fourth of the entire area in potatoes in the State was cultivated in this

valley, whilst it yielded one-fifth only of the entire product. But the per centage of the yield of buckwheat is just double the per centage of the relative amount of land in this crop.

Now, we take it for granted that the crop returns made by the assessors are equally reliable from all portions of the State. Is it then true that the farmers in the Miami valley understand the culture of some crops *better*, and of others *not* so well, as farmers of other valleys, or, is the soil in this valley better adapted to the growth of these extra average crops, and not so well adapted to those which fall below the average? We are well aware that the frost in August seriously injured the corn, sorgho, potato and tobacco crops, but that would affect the gross product but not affect the *pro rata*, from the fact that the frost extended over the entire State.

We have now, including Table No. 3, analyzed the crop and live stock returns of the Miami valley, and from this the agronomic condition of the valley must be apparent to the careful reader.

TABLE No. III.—LIVE STOCK IN THE MIAMI VALLEY.

No. of HORSES	151,042	No. of SHEEP	440,339
" " per square mile	20.13	" " per square mile	58.71
" acres in crops for each horse	9.41	" acres in crops for every sheep	3.24
" horses per 100 acres in crops	10.62	" sheep for every 100 acres in crops	30.86
" inhabitants to each horse	4	" inhabitants for every sheep	1.36
" horses to every 100 inhabitants	25	" sheep for every 100 inhabit'nts	73.52
No. of CATTLE	235,768	No. of SWINE	447,591
" " per square mile	31.43	" " per square mile	59.67
" acres in crops for every head of cattle	6.02	" acres in crops for every head of swine	3.17
" cattle per 100 acres in crops	16.62	" swine for every 100 acres in crops	31.54
" inhabitants to every head of cattle	2.57	" inhabitants for every head of swine	1.35
" cattle to every 100 inhabitants	38.91	" swine for every 100 inhabita'ts	74.81

Now, if we suppose each family to consist of *five* persons, we have the following as the agronomic condition of each family, including the city of Cincinnati, viz:

Horses to each family	1.25	Acres in crops to each family	11.70
Cattle "	1.94	Bushels produced "	216.40
Sheep "	3.67	Butter " lbs.	37.35
Swine "	3.74	Maple sugar " lbs.	9.80
Acres of land to each family	34.15	Maple and sorgho " gals. nearly	5.

From these tables in the aggregate it will be seen that the valley is in a

condition to export much of its "bushel" crops and largely of tobacco, yet it must import much butter, sugar, syrup and hay.

SCIOTO VALLEY.

This valley is composed of the counties of Adams, Delaware, Fayette, Franklin, Hardin, Highland, Jackson, Madison, Marion, Morrow, Pike, Pickaway, Ross, Scioto and Union. These counties embrace within their limits all the waters of the Scioto, and form a "valley" of about 160 miles in length, and an average breadth of less than 50 miles. The soil and topography of this valley varies much more than in any other valley in the State. The counties of Jackson and Pickaway contrast strongly in their topography, as well as in their soil and comparative perfection in agriculture. The geological formation of the lands west of the right bank of the Scioto differs from that on the east of the left bank. The formation west of the stream does not differ materially from that of the Miami valley, whilst that on the east almost embraces the lower series of the carboniferous formation. On the west of the river the lands are very level, on the east more "rolling," and from Pickaway county to the Ohio river the lands are very "broken," with many pleasant, fertile and extensive vales intervening.

TABLE No. IV.

Amount of square miles of area	7,500
Acres of plow or arable land	1,492,478
Acres of meadow or pasture land	705,021
Acres of woodland or uncultivated land	2,253,507
Total acres for taxation	4,451,006
Amount of acres in crops in 1863, measured by the bushel	886,419
Acres in crops in 1863, bearing other crops	207,675
Total acres in crops in 1863	1,094,094
Per cent. of the valley in crops in 1863	24.58
Miles of railroad	268
Square miles of area for 1 mile of railroad	28
Population in 1860	331,728
Population per square mile	44.23
Acres to each inhabitant in 1860	13.42
Acres in crops in 1863 to each inhabitant in 1860	3.29
Bushels per acre in 1863	20.40
Bushels in 1863 to each inhabitant in 1860	54.51

Notwithstanding the fact that the Scioto has nearly half a million more acres of *taxable* lands than the Miami, it has fully half a million acres more woodland, and in 1863 had 337,459 acres in crops *less* than its rival. In

fact it had no more than one-fourth of its cleared lands in crops. From the annexed table it will be seen that the Scioto valley does not equal the Miami in any product, whether considered in the light of absolute quantities, relative product per acre, or relative proportion of the entire State.

TABLE No. V.

	Acres.	Bushels.	Product per Acre.	Percentage of acres bearing crops in.	Percentage of crops in the State grown in the valley.	Percentage of land in crops in the State in 1868, in valleys.
Wheat	286,069	2,867,115	10.03	25.89	13.79	15.67
Rye	2,426	24,417	10.07	.22	7.75	7.51
Barley	2,262	41,196	18.21	.20	3.11	3.06
Buckwheat	1,919	15,078	7.85	.17	4.60	6.92
Corn	513,649	13,665,326	26.60	46.95	25.09	24.55
Oats	55,820	911,429	16.30	5.00	8.05	9.81
Flax	14,260	86,789	6.08	1.30	13.90	14.96
Potatoes	10,014	471,828	47.14	.91	8.67	12.40
	886,419	18,083,178	20.40			
Tobacco	1,561	835,389 lbs	535.5	.14	2.25	3.24
Sorgho	9,184	426,372 gals.	46.41	.83	18.41	27.60
Clover	38,338	20,618 tons.	0.53	3.50	6.90	9.89
Meadow	158,592	121,679 tons.	0.76	14.49	11.31	13.24
Clover seed	....	....	0.22	....	5.72	....
Flax fibre	....	....	85.84	....	31.05	....
Butter	....	3,279,159 lbs.	....	....	10.50	....
Cheese	....	198,317 lbs.	....	....	1.03	....
Maple sugar	....	844,612 lbs.	....	....	12.51	....
Maple syrup	....	69,649 gals.	....	....	15.65	....

The manifest impression which this table will make when compared with Table No. 2, is that the Scioto Valley is not so fertile as the Miami, but those who have traveled extensively in both are not so ready to concede the superiority of soil to the Miami, but all readily concede that farming seems to be conducted on a much better system in the Miami than in the Scioto Valley. There is undoubtedly less stimulus to cultivate in the Scioto, owing to the want of facilities to export the surplus produce, there being only one mile of railroad to twenty-eight square miles of territory, or about one third of the railroad facilities enjoyed by the Miami Valley. In the year 1868 the Scioto produced just one half the amount of the great staple, wheat, that was produced in the Miami Valley; and upon the whole the system of farming differs from that in the Miami.

From Table No. 5 it will be seen that the farmer in the Scioto Valley having one hundred acres to put into crops, does not follow the precise

proportions which obtain in the Miami—the Scioto farmer puts in less wheat, but more corn; less barley and tobacco, but more meadow. The relative proportion of crops in the Scioto Valley is as follows:

Wheat	25.98 acres.	Corn	46.95 acres.	Tobacco	0·14 acres.
Rye	0.22 "	Oats	5.00 "	Sorgho	0.83 "
Barley	0.20 "	Flax	1.30 "	Clover	3.50 "
Buckwheat	0.17 "	Potatoes	0.91 "	Meadow	14.49 "

This produces for him nearly 20½ bushels per acre of grain and root crops, enabling him to keep eleven head of horses, twenty-two head of cattle, sixty-nine sheep, and thirty-six head of swine. The amount of manure produced from the amount of live stock kept on each hundred acres more than is kept in the Miami, should do something towards increasing the fertility of the soil. The following table shows the analysis of the live stock returns in the Scioto Valley:

TABLE VI.—LIVE STOCK IN THE SCIOTO VALLEY.

No. of HORSES	121,900	No. of SHEEP	756,538
" " per square mile	16.25	" " per square mile	100.87
" acres in crops for every horse	8.98	" acres in crops for every sheep	1.44
" horses for ev'ry 100 ac. in crops	11.13	" sheep per 100 acres in crops	69.44
" inhabitants to each horse	.2.72	" " to every inhabitant	2.28
" horses to every 100 inhab'ts	36.76	" " to every 100 inhabitants	228.00
No. of CATTLE	246,775	No. of SWINE	395,058
" " per square mile	32.90	" " per square mile	52.69
" acres in crops for ev'ry head of cattle	4.43	" acres in crops for each head of swine	2.76
" cattle for every 100 ac. in crops	22.57	" swine to each 100 acres in crops	36.23
" inhab. to each head of cattle	1.34	" " " inhabitant	1.19
" cattle to every 100 inhab'ts	74.62	" " " 100 inhabitants	119.00

From the data contained in the several tables, we deduce the following as the average agronomic condition of each family of five persons in the Scioto Valley, viz:

Horses to each family	1.83	Acres of land in crops to each family	16.45
Cattle "	3.73	Bushels produced " "	272.55
Sheep "	11.40	Butter " " "	49.40
Swine "	5.95	Maple sugar " "	12.70
Acres of land to each family	67.10	Maple and sorgho syrup "	7.45

This shows a much better condition than in the Miami Valley, yet if the population of Cincinnati and Dayton are deducted from the Miami, and Columbus from the Scioto Valley, then the condition of the Miami families will be greatly superior to that of the Scioto. But we have not deemed it proper to deduct the population of either of the cities from the population of the valleys in which they are situated, because the city population is dependent upon and really derives its breadstuffs from the valley in which it is located.

MUSKINGUM VALLEY.

This valley contains nearly one million more acres of taxable lands than the Miami, and embraces the following counties, viz: Ashland, Carroll, Coshocton, Guernsey, Harrison, Holmes, Knox, Licking, Muskingum, Morgan, Noble, Richland, Stark, Tuscarawas, Washington, and Wayne. It embraces what was formerly considered the wheat region of the State. With the exception of a few counties, it lies entirely within the coal or carboniferous formation, has abundant lime and sandstone for industrial and economic purposes; is well watered, and as a hydrostatic basin is unequalled in the State for natural drainage. No considerable portion of it is as level as the western part of the Scioto or Muskingum Valleys; the entire valley is a succession of gentle undulations of surface —in some few instances these undulations are tolerably abrupt, yet there is very little land which is not adapted to agricultural purposes, by reason of the "brokenness" of the country. The agronomic condition of this valley is as follows:

TABLE No. VII.

Amount of square miles of area	8,128
Acres of plow or arable land	2,668,660
Acres of meadow or pasture land	553,740
Acres of woodland or uncultivated land	1,953,102
Total acres for taxation	5,175,502
Amount of acres in crops in 1863, measured by the bushel	1,011,392
Amount of acres in crops in 1863 bearing other crops	424,660
Total acres in crops in 1863	1,436,072
Per cent. of the valley in crops in 1863	27·12
Miles of railroad	464
Square miles of area for one mile of railroad	15·25
Population in 1860	455,276
Population per square mile	56
Acres to each inhabitant in 1860	11·37
Acres in crops in 1863 to each inhabitant in 1860	3·15
Bushels per acre in 1863	17·73
Bushels in 1863 to each inhabitant of 1860	39·39

This valley affords better data for ascertaining the real agricultural condition than either the Scioto or the Miami, because there is no city containing ten thousand inhabitants within its limits, according to the census of 1860. It embraces about one-fifth of the territory of the State, and contains about one-fifth of the population—hence it is not improper to infer that it should produce one-fifth of the gross product of the State In

the fifth column of Table No. 8, it will be seen that very few of the crops are under twenty per cent. or one-fifth in quantity of those produced in the entire State. It is further manifest that all the crops returned, except corn and rye, succeeded better in the Muskingum than in the Scioto Valley. So far as wheat is concerned, this valley cultivated about one-fifth of the land in wheat in the State, and produced from it about one-fifth of the aggregate amount produced. It falls short of its relative proportional quantity in rye, barley, buckwheat, corn, and oats; it exceeds in potatoes and sorgho, and then falls short on tobacco, clover, and meadow. Its railroad facilities are not equal to those of the Miami, but in course of time these facilities will probably exceed those of the latter—when the mineral resources of this valley are once fully developed, there is no other portion of the State which will require the same amount of facilities for transportation.

TABLE No. VIII.

	Acres.	Bushels.	Product per acre.	Percentage of acres bearing crops in—	Percentage of crops in the State grown in the valley.	Percentage of land in crops in the State in 1863.
Wheat	399,470	4,295,876	10·75	27·81	21·63	21·88
Rye	12,274	106,884	8·70	·85	33·95	38·00
Barley	18,109	281,238	16·27	1·12	21·29	24·53
Buckwheat	11,595	99,832	8·61	·80	30·70	41·83
Corn	369,833	9,102,414	24·61	25·76	16·72	17·68
Oats	173,039	2,991,304	17·29	12·05	26·34	30·41
Flax	12,604	80,837	6·41	0·87	12·94	13·23
Potatoes	14,468	975,960	67·49	1·00	17·95	17·99
	1,011,392	17,934,345	17·73			
Tobacco	14,700	9,044,329 lbs.	615.3	1·02	24·42	29·88
Sorgho	7,740	638,875 galls.	82·53	·53	27·58	23·28
Clover	135,167	88,501 tons.	0·65	9·40	29·63	34·87
Meadow	267,073	229,483 tons.	0·85	18·59	21·34	22·30
Clover seed	....	....	0·32	....	28·58	
Flax fibre	....	....	70·55	....	11·30	
Butter	....	7,266,432 lbs.	....	....	23·25	
Cheese	....	414,840 lbs.	....	....	2·17	
Maple sugar	....	1,046,103 lbs.	....	....	15·50	
Maple syrup	....	106,807 galls.	....	....	24·01	

From the fourth column in table No. 8, it will be seen that the farmer in the Muskingum Valley having 100 acres to put into crops apportions it as follows, viz:

Wheat	27.81	Corn	25.76	Tobacco	1.02
Rye	0.85	Oats	12.66	Sorgho	0.54
Barley	1.13	Flax	0.88	Clover	9.41
Buckwheat	0.80	Potatoes	1.	Meadow	18.59

The grain and root crops yield him 17.73 bushels per acre. In addition to these crops he keeps nearly ten horses, twenty head of cattle, one hundred and twenty head of sheep and nineteen hogs. This valley contains nearly one-third of the aggregate number of sheep in the State, and appears to be admirably adapted for wool growing.

The average agronomic condition of every family of five persons in the Muskingum Valley is as follows:

Horses to each family	1.54	Acres in crops to each family	15.75
Cattle " "	3.24	Bushels produced "	196.95
Sheep " "	19.63	Butter "	79.80
Swine " "	3.	Maple sugar "	11.45
Acres of land to each family	56.85	Maple and sorgho syrups in each family	8.15

It is conceded by every one capable of entertaining an intelligent opinion on the subject, that the Muskingum Valley is not near so fertile as either the Scioto or Miami valleys are, yet the agronomic condition of every family in the latter is superior to that of those in the Miami. The large proportion of stock kept in this valley must furnish sufficient manure, if properly appropriated, not only to maintain its present state, but gradually to increase its fertility. Corn is better adapted to the Scioto and Miami than the Muskingum Valley, and it is by no means improbable that the turnip crop would be more remunerative than corn at twenty-five bushels per acre.

TABLE No. IX.—LIVE STOCK IN MUSKINGUM VALLEY.

No. of HORSES	141,002	No. of SHEEP	1,788,270
" " per square mile	17.34	" " per square mile	220.01
" acres in crops for each horse	10.18	" acres in crops for every sheep	0.80
" horses for every 100 acres in crops	9.82	" sheep for every 100 acres in crops	125.
" inhabitants to each horse	3.22	" sheep for every inhabitant	3.92
" horses to every 100 inhabitants	30.97	" " " 100 inhabitants	392.70
No. of CATTLE	287,650	No. of SWINE	273,012
" " per square mile	35.39	" " per square mile	33.58
" acres in crops for every head of cattle	4.99	" acres in crops for every hog	5.26
" cattle for every 100 acres in crops	20.04	" swine for every 100 acres in crops	19.
" inhabitants to each head of cattle	1.54	" inhabitants to every swine	1.66
" cattle to every 100 inhabitants	64.93	" swine to every 100 inhabitants	60.28

MAUMEE VALLEY.

This valley comprises the following counties, viz: Allen, Auglaize, Crawford, Defiance, Fulton, Hancock, Henry, Lucas, Mercer, Ottawa, Paulding, Putnam, Sandusky, Seneca, Van Wert, Williams, Wood, Wyandot. It encloses that portion of the State known as the "*Black Swamp*," and for many years was not considered a very desirable portion of the State in which to locate. But since the several railways have been completed through this region, it is manifesting indubitable evidence of some day rivaling, at least, if not surpassing, the Miami Valley in fertility.

The following statement shows the agronomic condition of this valley:

TABLE No. X.

Amount of square miles of area	7,500
Acres of plow or arable lands	1,063,607
" meadow or pasture lands	374,042
" woodland or uncultivated lands	3,385,062
Total acres for taxation	4,795,811
Amount of acres in crops, in 1863, measured by the bushel	756,996
" " " bearing other crops	228,810
Total acres in crops in 1863	985,806
Per cent. of the valley in crops in 1863	20.5
Miles of railroad	527
Square miles of area for one mile of railroad	14.25
Population in 1860	295,323
Population to the square mile	39.37
Acres to each inhabitant in 1860	16.
Acres in crops in 1863 to each inhabitant in 1860	3.33
Bushels per acre in 1863	15.09
Bushels in 1863 to each inhabitant of 1860	44.39

The population of the valley is as strictly rural as that of the Muskingum, there being one city only (Toledo) containing more than ten thousand inhabitants, and there is only one other in the entire valley which contains 5,000 or over. It is twice as well supplied with railroad facilities as the Scioto, and fully as well as the Muskingum, besides having the advantage of a lake port. By comparing table No. 11 with similar tables of the other valleys, it will be found that the valley is either not adapted to the growth of corn, or else the corn in this region suffered more severely from the August frost than in other portions of the State, for there is no other valley or region in which the average is as low as eighteen bushels per acre, and the lowest average product per acre of tobacco is also found in this valley.

TABLE No. XI.

	Acres.	Bushels.	Product per acre.	Percentage of acres bearing crops in—	Percentage of crops in the State grown in the valley.	Percentage of land in crops in the State in 1863.
Wheat	315,101	3,406,683	10·81	31·96	15·15	17·26
Rye	2,127	20,772	9·76	·21	6·60	6·58
Barley	5,600	96,635	17·26	·56	7·31	7·58
Buckwheat	3,053	30,528	9·99	·30	9·21	11·02
Corn	328,146	5,999,073	18·28	33·28	11·04	15·68
Oats	74,033	1,612,047	21·77	7·50	14·05	13·01
Flax	16,528	95,175	5·76	1·676	15·25	17·34
Potatoes	12,408	850,750	68·60	1·287	15·64	15·37
	776,996	12,111,663	15·09			
Tobacco	774	374,514 lbs.	483·9	·0785	1·01	1·57
Sorgho	3,296	183,623 galls.	55·7	·3344	7·927	9·9
Clover	79,298	79,446 tons.	1·002	8·043	26·60	20·42
Meadow	145,442	143,632 tons.	0·987	14·75	13·35	12·14
Clover seed	....	....	0·662	.... ..	34·09	
Flax fibre	....	....	14·95	.... ..	6·26	
Butter	....	4,314,054 lbs.	.... ..	.... ..	18·81	
Cheese	....	135,659 lbs.	....	.... ..	·709	
Maple sugar	....	764,972 lbs.	....	.... ..	11·33	
Maple syrup	....	40,444 galls.	....	.... ..	9·09	

The following table shows that, considering the amount of land cleared, the number of inhabitants, and the comparatively recent settlement of this valley, great attention is being given to live stock. In 1830 the population of this valley amounted to 17,493 only; in 1840 it had increased 100,559, or more than five hundred per cent., and the increase from 1840 to 1860 is nearly three hundred per cent. No region of country having a *normal* or *full average* population for its fertility and commercial facilities, could under any known precedent increase so rapidly, and the inference is very manifest that the population is not yet very dense, nor are the agricultural resources fully developed.

TABLE No. XII.—LIVE STOCK IN THE MAUMEE VALLEY.

No. of HORSES	109,090	No. of SHEEP	662,882
" " per square mile	14·54	" " per square mile	89·24
" acres in crops for every horse	9·03	" acres in crops for every sheep	2·73
" horses to every 100 ac. in crops	11·07	" sheep to every 100 acres in crops	36·66
" inhabitants to every horse	2·70	" sheep to every inhabitant	2·26
" horses to every 100 inhabitants	37·03	" sheep to every 100 inhabitants	226·65

No. of Cattle	246,042	No. of Swine	288,388
" " per square mile	32·92	" " per square mile	38·44
" ac. in crops for ev'ry head of cattle	3·99	" acres in crops for every hog	3·41
" cattle to every 100 ac. in crops	25·06	" hogs to every 100 acres in crops	29·32
" inhab'ts to every head of cattle	1·15	" inhabitants to every hog	1·02
" cattle to every 100 inhabitants	86·95	" hogs to every 100 inhabitants	98·03

The Maumee Valley farmer having one hundred acres of land to put into crops in 1868, apportioned it as follows:

	Acres.		Acres.		Acres.
Wheat	31·96	Corn	33·28	Tobacco	0·07
Rye	·21	Oats	7·50	Sorgho	0·83
Barley	0·56	Flax	1·67	Clover	8·04
Buckwheat	·30	Potatoes	4·28	Meadow	14·75

These hundred acres produced for him of first eight specified crops 15·09 bushels per acre, and enabled him to keep *eleven* head of horses, twenty-five head of cattle, thirty-six head of sheep, and twenty-nine hogs. The average agronomic condition of every family consisting of five persons in this valley is as follows:

Horses to each family	1·85	Acres of land in crops to each family	16·66
Cattle "	4·34	Bushels produced " "	221·95
Sheep "	11·38	Butter " " "	70·00
Hogs "	4·90	Maple sugar " "	12·95
Acres of land "	30·00	Maple and sorgho syrup " "	3·85

Compared with the Scioto Valley, each family has about the same proportion of horses, sheep, acres of land in crops, and maple sugar; they have, however, more cattle, and consequently produce more butter than in the Scioto, but produce less bushels and have fewer swine, whilst the Scioto has twelve and one-third per cent. greater population.

WESTERN RESERVE.

This region embraces a greater variety of geological formations than any other in the State. The extreme east, bordering on Pennsylvania, is well supplied with bituminous coal *in situ*—the central portion is conglomerate formation, and the western partakes largely of drift, covering the upper silurian, or corniferous; whilst the northern portion is more lacustrine. But the agriculture is not so varied as the geological formations are. This district is composed of the following counties, viz: Ashtabula,

Cuyahoga, Erie, Geauga, Huron, Lake, Lorain, Medina, Mahoning, Portage, Summit and Trumbull. The following is its agronomic condition:

Amount of square miles of area	5,288
Acres of plow or arable land	857,484
" " meadow or pasture land	1,390,304
" " woodland, or uncultivated land	1,156,561
Total acres for taxation	3,404,349
Amount of acres in crops in 1863, measured by the bushel	393,441
" " " " in other crops	389,843
Total acres in crops in 1863	783,284
Per cent. of the crops in 1863	23.
Miles of Railroad	257
Square miles of area for one mile of railroad	10
Population in 1860	355,693
" per square mile	67.26
Acres to each inhabitant in 1860	9.57
" in crops in 1863 to each inhabitant of 1860	2.20
Bushels per acre in 1863	20.18
" in 1863 to each inhabitant of 1860	28.10

The railroad facilities of the Reserve are fully equal to those of the Miami Valley, and the Lake is of as much, if not more, importance to it than the Ohio river is to the Miami Valley.

It appears somewhat singular that both wheat and corn should succeed better on the Reserve than in the Miami or Scioto vallies—those which boast the greatest fertility of any portion of the State. The product per acre of wheat, corn, oats, flax seed, potatoes, tobacco, sorgho and clover hay, exceed those of the Miami Valley, and falls very little short on meadow hay. Why is this? Surely not on account of soil,—not on account of climate. It has been suggested that the Reserve reports more correctly than other portions of the State; but if we accept this explanation as the proper one, it jeopardizes, to say the least, the veracity of the other portions, and this we are not disposed to do. We are willing to believe that all have made equally correct returns to their respective assessors. A better system of culture obtains on the Reserve than anywhere else in the State, and it is to this fact, in a greater degree than in anything else, that the superior crops are found there. It is true that the varieties of corn grown in the Miami and Scioto vallies will not ripen on the Reserve, but this is the only exception. Potatoes do better there than in any of the vallies; so, too, with tobacco; and it is a singular fact that the only sample of *cotton* grown in Ohio and offered for competition for the

premium offered by the State Board, was grown in the open air on the Lake shore.

TABLE No. XIV.

	Acres.	Bushels.	Product per Acre.	Percentage of Acres bearing Crops in—	Percentage of Crops in the State grown on the Reserve.	Percentage of land in Crops in the State in 1863 on the Reserve.
Wheat	130.771	1,834,048	14·02	16·69	8·82	7·16
Rye	6.270	53,186	10·22	·68	17·12	10·32
Barley..................	11.567	188,846	16·34	1·47	14·29	15·66
Buckwheat	3.093	34,020	11·	·39	10·29	11·16
Corn	125.064	4,049,308	32·39	15·96	7·43	[illegible]·97
Oats	90.706	2,217,293	24·44	11·58	20·06	15·94
Flax....	10.433	82,087	7·87	1·33	13·15	10·95
Potatoes	16.537	1,536,329	92·92	2·11	28·25	20·49
	393.441	9,995,817	20·18			
Tobacco	551	661,056 lbs.	1200·	0·70	1·78	1·11
Sorgho.	981	92,562 galls.	94·35	·12	3·99	2·94
Clover.........	38.889	48,075 tons.	1·23	4.96	16·09	10·03
Meadow	349.422	323,828 tons.	0·92	44.61	30·12	29·19
Clover Seed	....	....	0·62	....	15·70	....
Flax Fiber...............	....	....	12·64	....	33·46	....
Butter	....	8,520,187 lbs.	....	....	27·27	....
Cheese...................	....	17,971,785 lbs.	....	....	94·03	....
Maple Sugar..............	....	2,564,259 lbs.	....	....	37·99	....
Maple Syrup..............	....	53.755 galls.	....	....	12·09	....

An examination of the following table (No. 15) wll show that the Reserve has about as many horses for every 100 inhabitants as the Miami Valley, nearly twice as many cattle, nine times as many sheep, but about one-third only as many hogs. Corn, cattle and swine preponderate in the Scioto Valley, corn and swine in the Miami, and corn, cattle and sheep on the Reserve. Whilst the area of the Reserve is about one-eighth of the State, it produces nearly one-third of the butter, fifteenth-sixteenths of the cheese, almost two-fifths of the maple sugar, one-third of the flax fibre, nearly one-third of the entire hay crop of the State, more than one-fourth of the potatoes, one-fifth of the oats. The apportionment of the acreage in crops is therefore different from that in the valleys.

TABLE No. XV.—LIVE STOCK IN WESTERN RESERVE.

No. of Horses......................	85,212	No. of Sheep	1,156,991
" " per square mile.......	16·11	" " per square mile.......	218·79
" acres in crops for every horse.	9·20	" acres in crops for every sheep	0·67
" horses to ev'ry 100 ac. in crops	10·86	" sheep to ev'ry 100 ac's in crops	149·22
" inhabitants to every horse....	4·17	" sheep to every inhabitant...	3·25
" horses to every 100 inhabitants......................	23.98	" sheep to every 100 inhabitants	325·26

No. of Cattle	257,766	No. of Swine	85,124
" " per square mile	48·74	" " per square mile	16·[illegible]
" acres in crops for every head of cattle	3·03	" acres in crops for each hog	9·20
" cattle to every 100 ac. in crops	33	" hogs to every 100 acres in crops	10·86
" inhabitants to every head of cattle	1·37	" inhabitants to every hog	
" cattle to every 100 inhabitants	73	" hogs to every 100 inhabitants	23·96

The Western Reserve farmer, with one hundred acres to put into crops, makes the apportionment somewhat different from the farmers in the Scioto and Miami valleys. His land in crops in 1863 were as follows:

	Acres.		Acres.		Acres
Wheat	16·69	Corn	15·96	Tobacco	0·07
Rye	0·68	Oats	11·58	Sorgho	0·12
Barley	1·47	Flax	1·33	Clover	4·96
Buckwheat	0.39	Potatoes	2·11	Meadow	44·81

The Reserve farmer puts in one-half the number of acres in wheat, twice the amount of rye, rather more than half the amount of barley, about the same amount of buckwheat, less than half the amount of corn, one-half more oats, one-half the amount of flax, almost twice the amount of potatoes, about one-twentieth of the amount of tobacco, one-fourth as much sorgho, one-half more clover, and nearly five times as much meadow as does the Miami Valley farmer. Hence arises a very pertinent question, "Does the Reserve farmer and the Miami farmer each grow such crops as are best adapted to their respective soils, or do they grow such crops and in such proportion as pay best in their immediate markets?" What is the cause of this great disproportion in the acreage of each in crops?

The average agronomic condition of each family of five persons on the Reserve is as follows:

Horses to each family	1·19	Bushels produced	140·[illegible]
Cattle " "	3·65	Butter "	119·75
Sheep " "	16·26	Cheese "	252·[illegible]
Swine " "	1·20	Maple sugar "	36
Acres of land to each family	47·85	Maple and sorgho syrups	2·66
Acres in crops in 1863 to each family	11		

HOCKING VALLEY.

This valley is smaller in superficial area than any other in the State, and is composed of the following counties: Athens, Fairfield, Gallia,

Hocking, Lawrence, Meigs, Vinton and Perry. This valley is well watered by numerous streams, of which the Hocking, or rather Hockhocking, is the principal one. The entire region is very "broken," and its mineral resources are perhaps greater than its agricultural. Lime, coal, iron ore and salt abound in almost inexhaustible quantities. Every county except Fairfield is located in the great Allegheny coal field.

The agronomic condition of this region, for it can scarcely be called a valley except in the sense of a hydrostatic basin, is as follows:

TABLE No. XVI.

Amount of square miles of area	3,466
Acres of plow or arable land	730,684
" meadow or pasture land	229,859
" woodland or uncultivated land	1,257,672
Total acres for taxation	2,218,215
Amount of acres in crops, in 1863, measured by the bushel	350,836
" " " in other crops	93,412
Total acres in crops in 1863	444,248
Per cent. of the valley in crops in 1863	20.
Miles of railroad	167
Square miles of area for one mile of railroad	20.75
Population in 1860	174,094
Population per square mile	50.22
Acres to each inhabitant in 1860	11.59
Acres in crops in 1863 to each inhabitant in 1860	2.49
Bushels per acre in 1863	17.90
Bushels in 1863 to each inhabitant of 1860	36.72

Next to the Scioto Valley, it has the least number of miles of railroad in proportion to its superficial extent, but then it enjoys a greater extent of river navigation than any other valley; four of the eight counties of which it is composed border on the Ohio river.

Being situated in one of the oldest settled regions of the State, it is natural to expect agriculture to have attained a greater degree of perfection than elsewhere. The acreage and products for 1863 are submitted in the following table:

TABLE No. XVII.

	Acres.	Bushels.	Product per acre.	Per centage of acres bearing crops in 1863.	Per centage of crops in the State grown in the valley.	Per centage of land in crops in the State in 1863 in the valley.
Wheat	156,708	1,716,248	10.95	35.27	8.35	8.58
Rye	1,825	17,226	11.88	.41	5.0	5.65
Barley	1,683	30,247	17.96	.37	2.28	2.28
Buckwheat	1,389	14,375	10.34	.31	4.23	5.01
Corn	154,665	3,916,518	25.33	34.01	7.19	7.39
Oats	28,154	399,653	14.20	6.33	3.38	4.94
Flax	1,484	9,058	6.10	.33	1.41	1.65
Potatoes	4,928	289,492	58.74	1.10	5.31	6.10
	350,836	6,392,912	18.22			
Tobacco......	2,656	1,900,932 lbs.	715.4.	.59	5.13	5.39
Sorgho.	4,631	363,342 galls.	78.45	1.04	15.68	13.92
Clover	13,057	7,080 tons.	.54	2.93	2.39	3.36
Meadow......	73,068	68,480 tons.	.93	16.45	6.37	6.24
Clover Seed...	......	....	.63	.....	2.71	.....
Flax Fiber....	......	....	42.54	.....	1.60	.....
Butter	......	1,936,289 lbs.	.....	.....	6.16	.....
Cheese	......	124,145 lbs.	.....	.....	0.64	.....
Maple Sugar..	......	200,782 lbs.	.....	.....	2.97	.....
Maple Syrup..	......	20,909 galls.	.....	.....	4.69	.....

Three-sevenths only of the area is "cleared," and less than half of this cleared was in crops in 1863, thus reducing the actual amount of acreage in the valley in crops to twenty per cent. of its entire area. The topography of this region does not differ essentially from that of the eastern portion of the Muskingum Valley, where so many sheep are kept; yet from the small comparative number kept in the Hocking Valley, it is very evident that sheep growing is not held in the same estimation as in the adjoining and more northern valley of the Muskingum. Cattle, horses and swine compare in relative proportions very favorably with the Muskingum, as may be seen from the following table:

TABLE No. XVIII.—LIVE STOCK IN HOCKING VALLEY.

No. of Horses......................	45,636	No. of Sheep......................	[illegible]
" " per square mile	13.16	" " per square mile	[illegible]
" acres in crops for every horse.	[illegible]	" acres in crops for every sheep..	[illegible]
" horses for every 100 acres in crops......................	10.27	" sheep for every 100 acres in crops......................	[illegible]
" inhabitants to each horse	3.09	" sheep to every inhabitant	[illegible]
" horses for every 100 inhabitants	[illegible]	" " " 100 inhabitants..	[illegible]

No. of Cattle		112,629	No. of S[illegible]		109,651
"	" per square mile	32.46	"	" per square mile	31.68
"	acres in crops for every head of cattle	3.95	"	acres in crops for every hog	4.05
"	cattle for every 100 acres in crops	25.31	"	hogs for every 100 acres in crops	24.60
"	inhabit'ts to every head of cattle	1.54	"	inhabitants to every hog	1.58
"	cattle to every 100 inhabitants.	64.92	"	hogs to every 100 inhabitants	63.20

So far as the wheat and corn crops are concerned, the Hocking farmer seems to be following the same relative proportions in area that is adopted in the Miami. The Hocking farmer apportions one hundred acres of crop land as follows:

	Acres.		Acres.		Acres.
Wheat	35·27	Corn	34·01	Tobacco	0·59
Rye	0·41	Oats	6·33	Sorgho	1·04
Barley	0·37	Flax	0·33	Clover	2·92
Buckwheat	0·31	Potatoes	1·10	Meadow	16·45

In grain and root crops he harvested 18·22 bushels per acre, and keeps a little over ten head of horses, twenty-five head of cattle, seventy-two head of sheep, and about twenty-five hogs.

The average agronomic condition of each family of five persons in this region for the year 1863 is as follows:

Horses to each family	1·62	Acres in crops to each family	12·45
Cattle "	3·24	Bushels produced "	183·60
Sheep "	9·11	Butter " "	55·30
Swine "	3·16	Maple sugar "	5·75
Acres of land "	57·95	Maple and sorgho syrups	11·00

The agricultural condition of the families in this region compare very favorably with that of any of the vallies.

In making this somewhat elaborate and extended analysis of the annual returns of crops and stock, we have steadily ignored every other element which might enter into the estimate, except that which is strictly agricultural, and for this reason have not deducted the population of cities, towns, and villages, but have regarded every individual in the State as being engaged in an active agricultural occupation. From one point of view this is really the only correct method of determining the supply produced for each family or individual in the State; on the other hand, however, it shows that the product or allotment to each family (if *all* were actually engaged in agriculture) would be contemptibly small.

Again, there are in every valley or district several counties, whose products are far above the average as returned, but their abundance is

neutralized by the failure of very poorly cultivated crops in another portion of the same valley or district. Hence the analysis of the following four counties will perhaps be more satisfactory than the analysis of a valley consisting of sixteen or twenty counties.

RIVER COUNTIES.

In dividing the State into valleys or hydrostatic basins, four counties, viz: Belmont, Columbiana, Jefferson, and Monroe, could not well be included in any of these basins, because in the range of counties immediately adjoining them on the west, the waters flow westward and southward, while the streams which water these counties as a general thing take their rise within their own boundaries, and flow into the Ohio river on their eastern boundaries; at the same time there are *ten* other counties which might with equal propriety be termed "river counties," but then all of the other ten have streams which rise in and flow through a portion of the valley or region in which they are included. These four counties are continuously situated on the right bank of the Ohio river, immediately below the confluence of the Beaver river into it in Pennsylvania. This entire area is very hilly: sometimes these hills present sides too steep to admit of successful operations with the plow. The following is the agronomic condition of these counties, viz:

Amount of square miles of area	1,907
Acres of plow or arable land	568,260
Acres of meadow or pasture	170,060
Acres of woodland or uncultivated land	482,409
Total acres for taxation	1,220,729
Amount of acres in crops in 1863 measured by the bushel	204,896
" " " " in other crops	95,326
Total acres in crops in 1863	300,322
Per cent of river counties in crops in 1863	24·58
Miles of railroad	172
Square miles of area for one mile of railroad	11
Population in 1860	121,099
Population per square mile	63·44
Acres to each inhabitant in 1860	10·81
Acres in crops in 1863 to each inhabitant in 1860	2·47
Bushels per acre in 1863	18·58
Bushels in 1863 to each inhabitant of 1860	31·40

These counties present the singular condition of having fifty per cent. more arable pasture and meadow land than they have woodland. They are almost as well supplied with railroad facilities as the Miami Valley in proportion to the area they occupy, and if we include river navigation, there are no other four counties which enjoy such facilities for transportation of surplus products as these do. The following table presents at a glance the average product, product per acre, &c., of these counties:

TABLE No. XX.

	Acres.	Bushels.	Product per acre.	Percentage of acres bearing crops in—	Percentage of crops in the State grown in the valley.	Percentage of land in crops in the State in 1863 in the valley.
Wheat	76,968	998,082	12·67	25·64	4·8	4·21
Rye	4,174	37,554	9·11	1·37	11·93	12·75
Barley	5,144	82,028	15·95	1·71	6·20	6·97
Buckwheat	1,340	12,504	9·32	·44	3·85	4·83
Corn	68,336	1,648,916	24·12	22·77	3·02	3·26
Oats	44,393	793,559	17·87	14·80	7·01	7·80
Flax	1,548	12,465	8·04	·51	1·99	1·62
Potatoes	3,050	219,162	71·84	1·01	4·02	3·78
	204,896	3,804,270	18·58			
Tobacco	7,218	5,629,801 lbs.	779·9	2·40	15·20	14·67
Sorgho	1,852	155,530 galls.	83·96	·61	6·71	5·56
Clover	23,168	17,595 tons.	0·75	7·71	5·88	4·07
Meadow	63,088	51,943 tons.	0·82	21·02	4·80	5·26
Clover seed	....	....	0·34	....	5·25	
Flax fibre	....	....	36·4	....	1·42	
Butter	....	1,403,478	....	....	4·49	
Cheese	....	181,070	....	....	0·94	
Maple sugar	....	136,791	....	....	2·02	
Maple syrup	....	20,272	....	....	4·55	

There is scarcely a crop grown in these counties which is not fully up to the average. The protecting influences of the Ohio river, so far as the effects of frost and drought are concerned, have no doubt done much towards securing such good crops. Some crops appear to be failures, or at least much below some other portions; this is no doubt owing to the fact that the soil was not adapted to such crops. The following table exhibits an analysis of the live stock in these counties:

Live Stock of River Counties.

No. of Horses	32,223	No. of Sheep	478,062
" " per square mile	16·89	" " per square mile	248·06
" acres in crops for every horse	9·72	" acres in crops to every sheep	0·63
" horses to every 100 acres in crops	10·28	" sheep to every 100 acres in crops	158·73
" inhabitants to every horse	3·75	" sheep to every inhabitant	3·90
" horses to every 100 inhabitants	26·66	" " " 100 inhabitants	390·60
No. of Cattle	59,879	No. of Swine	47,873
" " per square mile	31·89	" " per square mile	25·10
" acres in crops for every head of cattle	5·18	" acres in crops to every hog	6·27
" cattle to every 100 acres in crops	19·80	" hogs to every 100 acres in crops	15·94
" inhabitants to every head of cattle	2·02	" inhabitants to every hog	2·57
" cattle to every 100 inhabitants	49·50	" hogs to every 100 inhabitants	39·68

As these counties may be regarded, so far as similarity in population is concerned, as a continuation of the Muskingum Valley, it therefore is to be expected that the general system of agriculture, and the relative apportionment of soil for crops, will not vary materially from that of that valley. We find the following to be the apportionment of every 100 acres in crops in 1863, viz:

	Acres.		Acres.		Acres.
Wheat	25·64	Corn	22·77	Tobacco	2·49
Rye	1·37	Oats	14·80	Sorgho	0·61
Barley	1·71	Flax	0·51	Clover	7·71
Buckwheat	0·44	Potatoes	1·01	Meadow	21·02

The yield in grain and root crops is 18·58 bushels per acre. The amount of live stock to every 100 acres in crops is *ten* horses, nineteen head of cattle, one hundred and fifty-nine sheep, and sixteen hogs.

The average agronomic condition of every family of five persons is as follows, viz:

Horses to each family	1·33	Acres in crops to each family	12·35
Cattle " "	2·47	Bushels produced to each family	157·
Sheep " "	19·53	Butter " " "	57·95
Swine " "	1·98	Maple sugar " " "	5·60
Acres of land to each family	54·05	Sorgho and maple syrup to each family	7·25

TABLE No. XXII.

	PRODUCT PER ACRE.							
	State Average.	Miami Valley.	Scioto Valley.	Muskingum Valley.	Maumee Valley.	Hocking Valley.	Western Reserve.	River Counties.
Wheat	11·80	12·33	10·08	10·75	10·81	10·95	14·02	12·67
Rye	9·487	12·90	10·07	8·70	9·76	11·88	10·22	9·11
Barley	17·90	20·45	18·21	16·27	12·26	17·96	16·84	15·95
Buckwheat	7·60	22·18	7·85	8·61	9·99	10·84	11·	9·82
Corn	27·32	80·12	26·60	24·61	18·28	25·88	82·89	24·12
Oats	19·64	28·27	16·30	17·29	21·77	14·20	24·44	17·87
Meadow	0·92	0·971	0·76	0·85	0·98	0·93	0·92	0·82
Clover	0·84	0·627	0·58	0·65	1·00	0·54	1·23	0·75
Seed	0·48	0·205	0·22	0·82	0·66	0·68	0·621	0·34
Flax Seed	6·56	6·71	6·08	6·41	5·76	6·10	7·87	8·04
Fibre	387·1	152·7	85·84	70·55	14·95	42·54	126·4	86·4
Potatoes	54·99	56·75	47·14	67·49	68·60	58·74	92·92	71·84
Tobacco	751·	885·1	855·5	615·8	488·9	715·4	1200·	779·9

TABLE No. XXIII.

Per Centage of Land in Crops in the State in 1863 *in each of the Valleys.*

	Miami.	Scioto.	Musk'm.	Maumee.	Hock'ng.	Western Reserve.	River Counti's.
Wheat	25·24	15·67	21·88	17·26	8·58	7·16	4·21
Rye	12·99	7·51	88·	6·58	5·65	16·82	12·75
Barley	89·88	8·06	24·58	7·58	2·28	15·66	6·97
Buckwheat	19·25	6·92	41·88	11·02	5·01	11·16	4 88
Corn	25·45	24·55	17·68	15·68	7·89	5·97	8·26
Oats	18·08	9·81	80·41	13·01	4·94	15,94	7·80
Meadow	11·76	18·24	22·30	12·14	6·24	29·19	5·26
Clover	15·87	9·89	84·87	20·42	8·36	10·03	4·07
Flax	40·81	14·96	18·28	17·84	01·55	10·95	1·62
Potatoes	23·90	12·40	17·92	15·87	6·10	20·49	8.78
Tobacco	44·18	8·24	29·88	1·57	5 89	1·11	14·67
Sorgho	19·82	27·60	23·26	9·9	18·92	2 94	5·65

Table No. XXIV.

Showing the Per Cent. produced in each Valley as compared with the entire Product of the State,

	No. of Bush., tons, po'nds and galls. for State at large.	Miami Val.	Scioto Val'y.	Musk'm Val.	Maumee Val.	W. Reserve.	Hocking Val.	River Counties.	Total.
Wheat	20,452,410	27·31	18·79	21·63	15·15	8·82	3·25	4·8	99·75
Rye	805,939	17·20	7·75	33·95	6·60	17·12	5·	11·98	99·55
Barley.........	1,829,251	45·55	3·11	21·29	7·81	14·29	2·28	6·20	100·03
Buckwheat ...	225,858	37·10	4·60	30·70	9·21	10·29	4·23	3·85	99·98
Corn..	54,614,617	29·50	25·09	16·72	11·04	7·43	7·19	3·02	99·99
Oats............	11,817,561	21·16	8·05	26·34	14·05	20·06	3·33	7·01	100·
Meadow	1,095,489	12·71	11·31	21·34	12·85	30·12	6·87	4·80	100·
Clover	801,475	12·51	6·90	29·63	26·60	16·09	2·39	5·88	100·
Clover seed...	151,606	7·95	5·72	28·58	34·09	15.70	2·71	5·25	100·
Flax seed	624,224	41·32	13·90	12·94	15·25	18·15	1·418	1·996	99·97
Flax fiber	3,582,170	14·88	31·05	11·30	6·26	33·46	1·601	1·429	100·
Potatoes	5,297,498	20·22	08·677	17·95	15·64	28·25	5.812	4·02	100·47
Tobacco	37,022,328	53·80	2·255	24·42	01·01	1·785	5·131	15·20	103·59
Butter..........	31,121,275	14·51	10·50	23·25	13·81	27·27	6·165	4·491	100·
Cheese..........	19,180,750	0·490	1.038	2·17	0·709	94·03	0·649	0·9472	100·35
Sorgho.........	2,847,578	19·57	18·41	27·58	7·927	3·99	15·68	6·714	99·86
Maple sugar..	6,753,048	17·66	12·51	15·50	11·33	37·99	2·973	2·025	99·98
Maple syrup.	444,606	29·62	15·65	24·01	9·09	12·09	4·698	4·557	99·71

Table No. XXV.

Showing the per cent. of acres in crops in each valley and region of the State.

	State.	Miami Valley.	Scioto Valley.	Muskingum Valley.	Maumee Valley.	Hocking Valley.	Western Reserve.	River Counties.
Wheat......	28·49	32·40	25·98	27·81	31·96	35·27	16·69	25·64
Rye......	·509	·37	·22	·85	·21	·41	·68	1·37
Barley....	1·164	2·07	·20	1·12	·56	·37	1·47	1·71
Buckwheat	·425	·37	·17	·80	·30	·31	·39	·44
Corn	31·41	37·65	46·95	25·76	33·28	34·01	15·96	22·77
Oats......	9·037	7·24	5·00	12·05	7·50	6·33	11·58	14·80
Flax	1·502	2·7	1·30	0·87	1·67	·33	1·33	·51
Potatoes	1·272	1·35	·91	1·00	1·28	1·10	2·11	1·01
Tobacco	·775	1·53	·14	1·02	·07	·59	·070	2·40
Sorgho	·491	·046	·83	·53	·33	1·04	·22	·61
Clover..	6·366	3·32	3·50	9·40	8·04	2·93	4·96	7·71
Meadow.	81·56	9·9	14·49	18·59	14·75	16·45	44·61	21·03

Table No. XXVI.

Showing the agronomic condition of every family of five persons in the several valleys and regions of the State.

	Miami.	Scioto.	Musk'm	Maumee.	Western Reserve.	Hocking.	River Counties.
Horses	1·25	1·83	1·54	1·85	1·19	1·00	1·33
Cattle	1·64	3·73	3·24	4·34	3·65	3·24	2·47
Sheep	3·67	11·40	19·63	11·33	16·26	9·11	19·53
Hogs	3·74	5·95	3·00	4·90	1·20	3·16	1·98
Acres	34·15	67·10	56·85	80·00	47·85	15·96	54·05
Acres in crops	11·70	16·41	15·75	16·66	11·00	12·45	12·35
Bushels	216·40	272·55	196·95	221·95	140·50	183·60	157·99
Butter	37·35	49·40	79·80	70·00	119·75	55·30	57·95
Maple sugar	9·80	12·70	11·45	12·95	36·00	5·75	5·60
Maple and sorgho syrup	5·00	7·45	8·15	3·95	2·00	11·00	7·25

Table No. XXVII.

	No. sheep injured.	Estimate of injury done.	Aggregate value of sheep killed and wounded.	Horses. Number.	Horses. Value.	Cattle. Number.	Cattle. Value.	Mules, &c. Number.	Mules, &c. Value.	Sheep. Number.	Sheep. Value.	Hogs. Number.	Hogs. Value.
Miami	2,936	7,007 50	$27,910 00	151,042	9,983,237	235,768	3,378,833	4,261	338,528	440,339	1,581,470	447,591	1,555,414
Scioto	4,438	7,572 00	29,155 50	121,900	6,807,345	246,775	3,979,527	4,842	359,399	756,538	2,704,048	395,058	1,394,995
Muskingum.......	5,503	9,170 50	30,977 25	141,002	7,380,784	287,650	2,818,464	1,942	97,610	1,788,270	5,500.911	273,012	739,089
Maumee..........	2,912	4,912 50	18,647 50	109,090	5,074,417½	246,942	2,224,490½	1.273	64,733½	669,352	1,829,749	288,338	512,715
Western Reserve ..	3,998	5,313 00	18,012 50	85,212	5.393,789	257,766	3,981,757	1,382	68,048	1,156,991	3,464,241	85,124	305,249
Hocking	1,156	2,167 50	11,811 50	45,636	2,445,056	112,529	1,304,018	1,017	61,517	317,360	892,031	109,651	307,418
River counties....	1,613	3,279 00	9,657 25	32,223	1.833,616	59,879	694,463	525	29,198	473,062	1,464,196	47,873	152,798
	22,556	39,422 00	146,171 50	686,105	38,918,239½	1.447,309	18,381,552½	15,342	1,019,033½	5,601,912	17,436,646	1.646.647	4.967,778

	Horses per sq. mile.	Acres for every horse.	Horses per 100 acres.	Cattle pr sq. mile.	Acres for every head of cattle.	Cattle per 100 acres.	Mules pr sq. mile.	Acres per mule.	Sheep pr sq. mile.	Acres for every sheep.	Sheep per 100 acres.	Hogs per sq. mile.	Acres for every hog.	Hogs per 100 acres.
Miami	20·13	9·41	10·62	31·43	6 02	16·62	1·75	333·62	58·71	3·24	30·86	59·67	3·17	31·54
Scioto	16·25	8·98	11·13	32·90	4·43	22·57	1·54	222·95	100·87	1·44	69·44	52·67	2·76	36·23
Muskingum	17·34	10·18	9·82	35·39	4·99	20·04	4·18	73·94	220·01	·80	125·00	33·58	5·26	19·00
Maumee	14·54	9·03	11·07	32·92	3·99	25·06	5·93	774·39	89·24	2·73	36·63	38·44	3·41	29·32
Western Reserve.	16·11	9·20	10·86	48·74	3·03	33·00	3·82	566·77	218·79	·67	149·22	16·09	9·20	10·86
Hocking........	13·16	9·73	10·27	32·46	3·95	25·31	3·40	436·82	91·56	1·39	71·94	31·63	4·05	24·69
River counties ..	16·89	9·72	10·28	31·39	5·18	19·30	3·63	571·85	248 06	·63	158·73	25·10	6·27	15·94

TABLE No. XXVIII.

	WHEAT.		RYE.		BARLEY.		BUCKWHEAT.		CORN.	
	Acres.	Bushels.	No. Acres.	No. Bush.	No. Acres.	No. Bush.	No. Ac's.	No.Bush.	No. Acres.	No. Bush.
Miami	460,680	5,678,468	4,195½	54,137	29,435½	601,624	5,324¾	118,026	532,513	16,049,286
Scioto	286,069	2,897,115	2,425¾	24,417	2,262¼	41,196	1,919	15,078	513,649	13,665,326
Muskingum	399,470 7-12	4,295,876¼	12,274 1-12	106,884	18,109 7-12	281,238	11,595	99,832	369,833½	9,102,414
Maumee	315,101¾	3,216,683	2,126¾	20,772	5,600½	96,635	3,052¾	30,528	328,146¼	5.999,073
Western Reserve	130,771½	1.834,048	5,269¾	53,886	11,567	188,846	3,093¼	34,020⅛	125,063¾	4,049,308
Hocking	156,708	1,716,243	1,825½	17,226	1,683½	30.247	1,389½	14.375	154,664¾	3,916.518
River Counties	76,968	998,082	4,174	37,544½	5,144½	82,028¼	1,340½	12,513¾	68,335¾	1,648,916
	1,825,768½	20,796.515	32,290 5-6	314,866½	73.802 7 12	1,321,814½	27,714¾	324,373½	2,092,206⅝	54,430,841

	OATS.		MEADOW.		CLOVER.			
	No. Acres.	No. Bushels.	No. Acres.	Tons Hay.	Acres.	Tons Hay.	Bush Seed.	Ac's plowed under for manure.
Miami	102.918	2,394,233	140,890¾	136,741½	76,245	37,397	12,230 9-14	16,686
Scioto	58,820	911,429	158,592	121,679	41,173	20,618	8,763	2.835½
Muskingum	173.039 5-6	2,991.304	267,073¼	229,483	139,411	88,501¼	44,246¼	4,244
Maumee	74,033	1,612,047	145,442	143,632	85,278	79,446½	52,536¼	5,979¾
Western Reserve	90 706	2,217.293	349,421¾	323,828½	44,216½	48,075	24,116	5,327½
Hocking	28,154½	399.653	73.067¾	68,480¾	14,919¾	7,080¼	3,306⅛	1,862
River Counties	44,393½	793,559	63,088¼	51,943½	23,638¾	17,595½	8,049	470
	569,064 5-6	11,319,618	1,197,575¾	1,076,788	424,881½	298,713¾	153,247 9-14	37,404¾

	FLAX.			POTATOES.		TOBACCO.		BUTTER.	CHEESE.	STONE COAL.
	No. Acres.	No. Bu. Seed.	No. Pounds Fiber.	No. Acres.	No. Bush.	Acres Planted.	Pounds Produced.	No. Pounds.	No. Pounds.	Bu. Mined.
Miami....................	38,413½	257,931¼	586,601	19,283½	1,094,175	21,746¼	18,591,008	4,534,470	93,674	....
Scioto....................	14,260	86,789	1,224,652	10,014	471,828	1,560¼	835,389	3,279,159	198,317	313,543
Muskingum.................	12,604 1-12	80.836¼	44 ,584	14,467¼	975,960½	14,699¼	9,044,329	7,266,432	414,840	5,837,469
Maumee....................	16,528½	95.175 4-15	247,044	12,408½	850,750	774 1-12	374,514	4,314,054	135,659	....
Western Reserve...........	10,433¼	87,087½	1,319,242	16,537½	1,536,329	550 3-5	661,056	8,520,187	17,971,785	4,400,351
Hocking...................	1,484	9,058¼	63,143	4,927¼	289,592	2.655¼	1,900,932	1,926,289	124,145	12,054,005
River Counties............	1,548	12,465	56,358	3,050 2-8	219,162½	7,218	5,629,801	1,403,478	181,070	4,245,370
	95,271 2-6	624,344 1-20	3,942,624	80,689½	5,437,797	49,205 3-5	37,037,029	31,244,069	19,119,490	25,850,738

	PIG. IRON.	SORGHUM.			MAPLE SUGAR.		DOGS.	SHEEP KILLED.	
	Tons Manuf.	No. Acres.	No. Pounds. Sugar.	No. Gallons Syrup.	No. Pounds.	No. Gallons Syrup.	Total No.	Number.	Value.
Miami.....................	....	6,595½	6,813	453,477½	1,192,905	133,056½	40,465	5,169	20,902 50
Scioto....................	32,257	9,184	6,072	426,372	844,612	69,649	30,146	6,653	21,488 50
Muskingum.................	....	7,739¾	3,721	638,875	1,046,103	106,807	41,489	6,916	21,798 75
Maumee....................	....	2,296½	9,141	183,623	764,972	40,444½	26,743	4,448	13,735 00
Western Reserve...........	1,250	980¼	1,781	92,562	2,564,259	53,755¼	18,113	3.732	12,699 50
Hocking...................	12,397	4,631	615	863,342	200,782	20,908¾	16,670	3,268	9,639 00
River Counties............	2,400	1,852¼	1,972	155,530½	136,791	20,272	9,758	1,965	6,378 25
	48,304	33,279½	30,115	2,313,782	6,750,424	444,893½	183,334	32,151	106,641 50

Number and Value of Horses, Cattle, Mules, Sheep, Hogs, and Dogs, in Ohio, for 1868.

Counties.	Horses.		Cattle.		Mules, etc.		Sheep.		Hogs		Dogs.	
	No.	Value.	No.	Value.	No.	Value.	No.	Value.	No.	Value.	No.	Value.
Adams	6,949	$319,113	15,443	$132,591	245	$10,233	23,612	$45,588	25,235	$37,059	1,574	$4,726
Allen	7,428	264,458	19,195	115,724	157	4,639	32,917	62,345	37,343	39,790	1,715	3,972
Ashland	8,863	408,673	20,910	160,843	137	4,927	85,827	211,704	23,700	39,894	1,759	3,379
Ashtabula	9,183	380,796	40,674	478,800	166	6,293	91,752	202,693	5,999	14,536	826	3,646
Athens	5,947	264,436	18,612	198,239	84	3,422	46,176	125,628	17,006	25,123	1,225	3,050
Auglaize	6,714	273,449	16,596	123 942	388	16,593	21,423	40,608	28,156	39,367	1,560	2,756
Belmont	11,381	616,451	22,860	246,514	158	8,857	132,688	479,122	25,746	53,295	2,317	7,634
Brown	10 047	489,768	17,606	161 287	372	16,332	21,938	52,164	38,537	64,183	3,441	5,173
Butler	11,512	666,366	16,236	200,479	252	15,050	7,114	23,025	42,012	126,671	3,206	4,545
Carroll	5,310	253,433	12,641	94,891	90	2,706	132,614	321,565	9 755	14,122	1,147	4,030
Champaign	9,106	523,589	18,833	242,169	413	23,126	48,226	163,828	28,204	76,559	2,096	5,427
Clarke	9,032	591,025	18 993	254,634	459	22,219	95 807	187 051	32,329	76,100	2,013	4,871
Clermont	9,629	532,618	14,974	173,817	568	32,305	14,226	39,691	36,859	63,590	3,028	5,526
Clinton	9,515	492,983	17,967	242,507	328	14,796	39 625	132,125	58,258	142,539	2,287	4,446
Columbiana	9,595	437,551	18 971	174 483	230	10,250	157,751	434,853	14,942	29,820	2,225	6,531
Coshocton	8,830	389,891	23,158	177,265	97	4,624	109,372	337,060	25,524	37,325	2,885	5,698
Crawford	8,365	396,807	21,036	191,361	96	4,851	69,583	220,987	33,719	53,909	1,344	3,282
Cuyahoga	11,569	541,828	27,071	365,067	106	5,394	65 557	164,246	8,651	24,314	1,375	5,165
Darke	10,541	515,232	24,096	174,390	90	4,177	22,311	47,823	54,794	88,652	2,457	5,702
Defiance	4,665	205,725	13,853	110,570	22	915	15,593	39,439	13,494	19,809	881	2,068
Delaware	8,920	434,993	19,905	205,722	325	14,221	84,795	273,172	26,759	63,283	1,984	5,348
Erie	5,945	321,213	10,730	139,969	43	1,360	49,019	140,002	10,231	21,389	801	2,975
Fairfield	11,855	534,866	26,121	222 466	214	10,198	38,677	105,381	46,373	[illegible]	3 214	7,315
Fayette	9,579	457,661	21,383	365,726	435	18,678	50,454	134 530	60,814	147,342	1,541	3,987
Franklin	14,768	727,400	24,125	307,142	260	15,029	33,462	98,271	63,025	153,664	2,167	10,405
Fulton	4 823	163,997	15,924	117,147	67	2 437	34,237	52,307	9,573	11,253	854	2,345
Gallia	5,826	252,309	14,222	129 506	181	9,356	22,819	42,243	14,121	17,714	1,789	2,868
Geauga	5,804	268,169	33,511	489,420	100	3 102	57,396	165,009	3,546	11,813	749	2,097
Greene	10,424	627 259	18,404	258,715	568	28,347	30,925	99 033	50,797	122,717	2,192	4,859
Guernsey	8 657	373,105	19,171	156,331	152	6,750	143,700	377 209	16 095	25,425	1,721	5,587
Hamilton	16,419	955,292	18,496	291,063	986	75,785	4,701	12,012	32,102	74,665	29,349	.....
Hancock	9,780	385,431	26,450	164,944	76	2,726	50,368	102,163	41,822	47,810	1,932	4,531

Hardin	5,689	230,212	16,704	142,610	140	5,463	23,822	61,623	24,913	34,976	1,358	3,597
Harrison	5,970	332,962	11,785	122,615	103	4,730	187,111	605,276	9,774	22 969	1,310	4,009
Henry	2,994	101,763	6,560	63,820	26	790	7,612	15,413	6,103	7,075	535	1,814
Highland	11,165	533,626	21,922	230,151	768	39,847	31,962	77,645	57,878	121,045	2,687	5 882
Hocking	5 245	219,902	13,298	100,540	76	2,925	30,718	61 043	16,210	22,063	1,574	4 551
Holmes	7,341	312,914	18,272	120,503	74	3,646	62,100	141,628	19 930	28,980	960	3,492
Huron	10,346	453,324	25,304	272,815	237	6,474	120,728	244,080	19,717	37,187	1,706	5,452
Jackson	4,542	165,330	15,185	136,012	148	6,741	18,136	28,627	13,146	12,448	1,818	3,963
Jefferson	6,728	349,016	13,908	122,865	52	2,310	154,256	447,220	12,521	22,479	1,132	4,681
Knox	10,294	468,009	21,145	181,911	196	7,467	120,380	367,956	24,559	46,837	1,618	5,478
Lake	4,555	204,997	13,127	175,499	62	2,498	48,481	129,838	3,510	10,928	386	2,133
Lawrence	3,219	180,752	12,195	151,395	231	13,798	10,319	21,973	12,255	17,588	2,327	6,239
Licking	13,699	659,230	29,400	324,688	170	7,226	215,697	740,814	34,244	77,166	2,522	6,537
Logan	8,665	422 972	19,562	194,023	532	22,550	47,812	126,610	32,347	52,809	1,998	6 240
Lorain	10,310	427,998	31,905	378,711	80	2,970	123,570	299,289	12,457	22,557	1,211	4,025
Lucas	4,341	174,360	10,569	95,890	41	2,230	14,029	29,400	7,269	10,440	629	1 740
Madison	7,410	371,365	19,108	399,717	321	14,250	101,640	352,463	30,516	72,065	1,363	3,291
Mahoning	8,071	394,958	21,474	263,511	321	14 753	103,300	309,120	9,834	23,035	2,079	4,382
Marion	7,606	360,720	20,252	227,676	142	5,035	81,003	279,110	27,695	47,597	1.639	4,810
Medina	8,520	422,905	23,790	266,045	45	2,215	124,528	349,536	11,120	26,308	1,575	3,669
Meigs	5,087	245,249	14,740	166,913	182	9,756	23,930	69,894	13,708	16,765	1,960	4,119
Mercer	6,178	253,513	14,886	99,251	91	3,633	18,527	35,659	47,356	44,886	979	2,118
Miami	9,146	542 639	16,561	147,564	308	16,697	17,079	49,803	38,580	96,126	2,416	5,216
Monroe	6,565	271,570	17,850	161,801	57	2,693	35,523	97,117	15,535	22,015	2,721	5.362
Montgomery	12,100	695,348	19,170	178,102	125	8,535	10,653	24,026	41,077	91,746	314	581
Morgan	7,234	317,487	19,797	165,181	133	6,833	58,300	157,453	17,923	24,789	1,534	3,875
Morrow	8,246	372,745	19,995	166,739	196	7,055	82,324	274,411	21,343	42,239	900	3,609
Muskingum	12,642	565,531	33,790	291,715	198	8,216	131,661	354,490	29,623	57,041	3,748	2,591
Noble	7,291	280,297	18,510	133,462	97	3,015	44,673	94 519	15,962	23,705	1,482	4.667
Ottawa	2,575	118,958	5,237	65,647	3	120	13,242	24,784	8,420	12,809	594	1,560
Paulding	1,615	63,354	6,284	54 246	11	535	3,153	5,939	6,457	7,197	689	1,885
Perry	7,029	276,936	20,768	142,908	153	4,563	70,439	158,221	19,592	28,942	1,620	3,883
Pickaway	11,216	553 737	27,491	460,139	750	52,072	23,390	63,695	60 752	155,998	1,834	5,568
Pike	4,771	221,611	10,751	102,814	201	9,375	13,996	25,410	18,676	38,700	1,450	4,344
Portage	8,136	405,869	31,720	450,727	124	4,837	111,065	336,257	7,282	22,406	1 248	4,179
Preble	8,829	548,289	15,740	176,566	95	6,770	12,779	52,549	47 909	154,202	1,698	3,771
Putnam	5,373	205,391	16,517	112,801	77	3,710	18,083	40,092	21,759	25,199	1,054	3.433
Richland	10,474	533,880	24,749	198,071	210	10,126	80,179	229,028	31,982	49,580	2,397	6,865
Ross	12,313	614,183	25,335	363,501	863	42,988	25,931	61,338	67,691	158,878	2,735	6,596
Sandusky	7,756	321,858	17,614	139,201	38	1,855	34,765	65,557	21,683	28,469	965	2,417
Scioto	4,911	242,777	13,533	151,215	323	23,227	12,025	19,718	17,812	33 306	1,777	4,412
Seneca	11,634	564,549	28,104	183,369	53	9,630	89,406	252,592	[illegible]	58,960	1,623	4,763

Number and Value of Horses, Cattle, Mules, Sheep, Hogs, and Dogs, in Ohio, for 1868—Continued.

Counties.	Horses.		Cattle.		Mules, etc.		Sheep.		Hogs.		Dogs.	
	No.	Value.	No.	Value.	No.	Value.	No.	Value.	No.	Value.	No.	Value.
Shelby	7,311	$335,726	15,171	$114,012	191	$8,833	28,804	$81,146	31,089	$49,13[illegible]	1,910	$4,402
Stark	12,283	593,697	31,881	233,670	80	5,509	110,678	257,776	30,005	53,292	2,292	5,986
Summit	7,530	403,612	23 667	294,133	60	3 572	75,152	243,729	11,604	27,619	943	2,911
Trumbull	9,592	445,340	43,512	549,118	315	14,279	103,635	318,277	7,563	20,436	1,295	4,368
Tuscarawas	9,904	448,455	26,793	175,128	105	4,067	128,917	320,082	25,221	31,200	2,245	6 640
Union	8,146	377,672	18,101	206,357	386	17,426	41,921	160,760	25,548	59,466	1,734	3,785
Van Wert	4,008	151,757	11,980	78 313	49	2,517	13,012	26,791	20,132	19,422	779	2 615
Vinton	3,454	144 598	11,731	121,305	127	5,733	28,348	58,203	9,698	12,361	1,617	3,804
Warren	10,284	591,797	15,346	204,986	87	6,905	17,740	61,453	40,157	118,402	1,963	4,866
Washington	7,704	344,224	22,662	233,780	208	9,355	46,352	136,116	18,074	30,461	2,897	6,537
Wayne	12 602	590 049	31,852	240,385	184	9,944	88,741	218,075	33 023	61,52[illegible]	1,552	4,928
Williams	5,574	244,786	16,199	139,659	16	630	29,938	66,517	16,663	27,620	957	3,041
Wood	6,502	227,630	20,640	148,608	108	2 365	23,952	39,362	16,069	17,859	1,280	4,304
Wyandot	6,610	310,360	17,589	179,476	192	8,440	52 227	229,745	22,866	37,375	1,788	4,607
Totals	716 825	34 198,314	1,734,788	17,869,544	18,026	896,482	5,042,439	14,337,068	2,239 358	4,334,451	178,472	384,963

Statement showing the Crops, embracing Wheat, Rye, Barley, Buckwheat, Corn, Oats, Meadow, Clover, Flax, Potatoes, Tobacco, Butter, Cheese, Stone-Coal, Pig-Iron, Sorghum, and Maple Sugar, for the year 1863; *and also the number of Dogs, and the number and value of Sheep killed and injured by Dogs.*

Counties.	Wheat.		Rye.		Barley.		Buckwheat.	
	Acres sown.	Bushels produced.	Acres sown.	Bushels produced.	Acres sown.	Bushels produced.	Acres sown.	Bushels produced.
Adams	25,718	283,057	56	605	40	769	25	254
Allen	21,390	170,745	117	875	167	1,667	173	1,369
Ashland	24,965	248,003	605	5,649	1,868	32,521	590	6,603
Ashtabula	5,458	97,331	361	4,015	358	6,218	285	3,669
Athens	17,826	194,559	86	945	10	160	226	2,748
Auglaize	18,480	144,291	201	1,310	1,279	22,300	100	1,170
Belmont	23,588	287,256	638	6,683	1,837	32,802	309	3,178
Brown	27,437	332,920	267	2,877	236	4,699	45	363
Butler	39,766	495,953	200	1,113	9,501	187,393	111	1,292
Carroll	15,045	141,766	1,796	14,120	789	11,814	847	6,769
Champaign	33,128	393,145	217	2,381	756	17,791	167	2,242
Clarke	29,488	392,872	402	5,058	409	9,778	81	868
Clermont	20,319	231,888	322	2,954	899	5,335	79	1,034
Clinton	25,122	244,573	120	1,503	197	3,701	261	2,622
Columbiana	17,914	243,254	1,873	16,192	706	10,367	823	4,837
Coshocton	27,589	228,783	815	6,200	446	5,261	1,010	8,676
Crawford	15,988	147,341	170	1,716	1,512	27,561	330	3,736
Cuyahoga	5,498	73,007	673	7,738	472	7,654	143	2,266
Darke	36,658	505,972	530	6,534	2,137	51,472	80	416
Defiance	15,752	219,080	50	653	35	569	11	85
Delaware	15,193	139,972	283	2,760	210	3,789	178	1,456
Erie	15,899	250,041	26	424	948	16,930	256	2,906
Fairfield	35,611	474,186	658	6,384	1,253	23,675	90	929
Fayette	14,363	142,200	251	3,278	32	874	36	442
Franklin	25,255	211,892	390	3,520	931	18,095	239	2,766
Fulton	14,491	225,194	84	882	70	1,398	173	1,176
Gallia	21,560	232,690	50	402	22	184	105	1,051
Geauga	3,253	44,624	315	3,825	101	1,346	184	1,895
Greene	57,596	344,543	353	4,135	841	19,399	59	799
Guernsey	16,935	133,343	706	5,436	338	4,277	710	5,442
Hamilton	13,130	172,240	311	3,883	3,693	69,400	131	1,104
Hancock	27,107	223,335	127	977	276	4,637	347	4,396
Hardin	14,427	130,126	101	806	56	686	133	1,129
Harrison	12,854	124,715	490	3,988	311	6,197	330	2,135
Henry	8,200	107,005	34	454	10	97	60	540
Highland	38,189	367,885	141	1,099	32	473	98	709
Hocking	19,039	163,994	339	2,720	100	1,451	241	1,929
Holmes	24,032	286,692	1,160	12,472	1,045	14,909	1,064	12,918
Huron	21,800	300,577	70	726	1,752	31,018	182	2,137
Jackson	16,261	141,627	52	316	......	......	35	269
Jefferson	17,316	178,904	740	5,921	[illegible]	35,286	234	1,274
Knox	24,820	206,067	808	6,388	553	9,637	1,061	10,731
Lake	5,463	81,764	96	1,181	1,127	20,588	183	2,318
Lawrence	14,619	178,354	60	1,317	11	162	120	1,541
Licking	25,325	231,197	1,132	8,479	392	5,347	557	4,702
Logan	24,455	250,275	297	1,453	161	3,368	239	2,198
Lorain	11,643	146,520	375	973	817	10,668	79	1,075
Lucas	8,666	113,048	95	902	158	3,417	223	1,247
Madison	8,484	79,239	290	3,185	33	1,001	119	1,479
Mahoning	10,272	138,001	764	7,736	669	11,609	409	3,392
Marion	13,886	130,411	81	457	252	4,363	161	1,131
Medina	12,376	127,363	319	3,261	939	16,414	185	1,709
Meigs	18,900	199,341	146	1,243	102	1,218	109	1,234

STATEMENT SHOWING THE CROPS, &c.—Continued.

Counties.	Wheat.		Rye.		Barley.		Buckwheat.	
	Acres sown.	Bushels produced.	Acres sown.	Bushels produced.	Acres sown.	Bushels produced.	Acres sown.	Bushels produced.
Mercer	19,315	193,172	237	2,409	486	7,971	160	
Miami	36,450	611,696	220	3,322	2,549	61,389	65	
Monroe	18,150	158,768	926	8,748	282	3,57[illegible]	715	
Montgomery	38,291	663,833	291	3,716	2,028	52,298	47	
Morgan	20,255	227,925	135	877	134	1,828	214	
Morrow	9,647	54,134	219	1,567	346	6,210	40	4,068
Muskingum	30,955	282,124	485	4,190	551	7,733	475	4,343
Noble	18,490	206,125	202	2,215	39	771	178	1,899
Ottawa	6,215	77,117	24	280	35	600	128	1,580
Paulding	4,059	48,288	6	88	1	18	3	16
Perry	19,883	182,621	431	3,675	169	2,863	355	3,291
Pickaway	31,192	361,725	61	2,377	131	1,599	46	609
Pike	12,883	118,448	67	475	3	52	66	359
Portage	11,208	168,967	872	9,636	1,184	21,046	365	3,890
Preble	34,094	520,509	226	2,613	1,603	33,155	54	899
Putnam	14,019	135,454	122	1,483	56	620	110	632
Richland	27,869	277,391	1,091	9,069	1,756	32,464	1,994	11,599
Ross	33,522	386,656	266	2,258	114	1,762	104	297
Sandusky	22,330	305,962	128	2,022	73	1,409	359	5,591
Scioto	13,685	167,837	20	186	45	868	48	337
Seneca	38,373	434,620	212	2,336	694	12,079	223	2,688
Shelby	20,452	216,163	307	2,435	1,378	13,054	155	1,360
Stark	37,327	635,625	703	7,244	6,218	104,712	386	4,565
Summit	21,364	307,304	494	5,955	3,104	43,811	169	2,219
Trumbull	6,538	98,549	903	8,416	96	1,544	654	6,553
Tuscarawas	30,138	346,486	1,080	10,077	1,238	15,098	206	9,505
Union	14,039	105,822	147	1,530	37	652	132	1,029
Van Wert	12,060	92,704	105	1,210	81	1,332	109	465
Vinton	10,099	80,397	102	632	9	176	117	1,019
Warren	27,313	321,787	133	1,160	3,623	68,782	148	1,573
Washington	26,420	274,487	554	5,151	32	540	323	2,759
Wayne	36,451	462,147	513	5,310	2,400	37,139	650	6,210
Williams	16,691	247,586	72	882	82	1,307	34	127
Wood	16,035	168,823	100	1,120	198	4,429	230	2,090
Wyandot	16,918	163,997	158	1,171	365	4,622	307	3,277
Total	1,811,278	20,452,410	32,257	305,939	74,348	1,329,251	24,846	225,858

STATEMENT SHOWING THE CROPS, &c.—Continued.

COUNTIES.	CORN.		OATS.		MEADOW.	
	Acres planted.	Bushels produced.	Acres sown.	Bushels produced.	Acres.	Tons of hay.
Adams	29,654	723,388	3,322	41,398	5,613	4,458
Allen	19,769	403,956	2,845	48,425	7,411	5,039
Ashland	18,972	477,037	12,025	296,489	17,079	16,817
Ashtabula	8,837	342,420	8,420	228,556	49,913	49,498
Athens	16,801	598,156	3,010	47,497	11,308	14,014
Auglaize	16,930	289,490	5,053	83,882	5,457	5,086
Belmont	25,559	700,911	12,841	269,769	18,907	16,276
Brown	34,457	924,435	6,725	78,670	8,893	5,995
Butler	51,666	2,275,145	6,258	136,490	6,595	7,020
Carroll	10,695	223,602	10,432	175,509	13,796	11,113
Champaign	35,898	952,762	6,549	160,196	11,247	12,036
Clarke	31,606	934,942	5,625	134,084	13,030	13,455
Clermont	31,930	909,597	9,113	158,219	14,055	13,231
Clinton	45,389	1,382,012	4,336	84,610	11,480	8,741
Columbiana	13,859	288,478	13,778	320,488	19,348	17,896
Coshocton	29,034	753,958	8,097	97,236	14,553	10,245
Crawford	29,233	619,171	9,448	272,875	12,774	15,473
Cuyahoga	8,309	282,736	8,124	168,989	32,812	32,099
Darke	31,701	520,931	6,738	134,161	10,311	11,022
Defiance	9,281	197,893	3,095	66,136	6,235	5,391
Delaware	26,532	662,740	3,963	80,449	19,748	18,513
Erie	14,202	353,024	4,765	113,693	9,876	10,944
Fairfield	41,192	1,065,633	7,080	122,992	10,697	10,315
Fayette	46,468	1,698,026	1,173	26,853	6,080	4,874
Franklin	55,507	1,591,252	6,314	111,927	13,037	11,760
Fulton	10,135	270,056	3,605	86,974	11,750	12,714
Gallia	20,100	461,682	3,815	45,584	8,200	7,441
Geauga	4,725	132,397	4,992	121,585	34,650	26,215
Greene	41,343	1,486,020	4,206	92,298	7,226	7,513
Guernsey	18,403	413,751	7,352	111,536	18,390	12,216
Hamilton	28,002	1,093,779	6,171	137,909	13,631	14,784
Hancock	27,906	748,890	6,207	130,081	10,248	11,212
Hardin	15,565	262,624	3,095	49,989	7,304	5,513
Harrison	13,046	349,339	6,617	121,619	18,912	13,106
Henry	7,382	189,152	1,663	33,291	4,497	5,057
Highland	52,928	1,610,424	3,157	42,514	12,406	7,858
Hocking	15,878	353,888	3,552	44,745	7,673	6,065
Holmes	17,272	424,128	8,706	167,972	12,476	12,350
Huron	19,979	535,350	10,622	256,812	24,800	23,185
Jackson	16,593	323,791	4,030	44,558	9,790	7,894
Jefferson	12,445	255,506	9,439	182,273	14,146	10,803
Knox	29,231	788,356	6,696	123,745	18,735	16,053
Lake	5,143	209,691	2,830	74,770	15,210	16,883
Lawrence	15,801	370,560	2,281	22,093	3,493	3,215
Licking	48,647	1,098,694	9,222	149,888	25,849	20,277
Logan	26,966	670,182	4,539	103,084	10,569	10,756
Lorain	12,712	405,871	6,089	143,096	30,697	27,234
Lucas	6,410	217,448	1,814	42,222	10,672	11,842
Madison	37,627	1,296,122	3,806	49,312	11,889	11,586
Mahoning	9,753	242,498	10,022	240,552	25,151	23,426
Marion	26,475	625,204	5,152	117,145	13,478	12,122
Medina	12,642	403,074	9,974	241,512	26,396	22,211
Meigs	14,109	360,447	2,539	35,722	11,332	11,261
Mercer	17,335	291,446	5,227	85,556	5,844	5,150
Miami	40,403	879,689	8,277	205,887	4,617	4,626
Monroe	16,273	404,021	8,335	121,029	10,687	6,969

STATEMENT SHOWING THE CROPS, &c.—Continued.

COUNTIES.	CORN.		OATS.		MEADOW.	
	Acres planted.	Bushels produced.	Acres sown.	Bushels produced.	Acres.	Tons of hay.
Montgomery	34,975	1,165,759	10,733	266,773	5,607	5,967
Morgan	16,420	432,531	3,090	49,085	11,529	9,429
Morrow	16,639	409,854	7,534	163,484	20,476	19,171
Muskingum	38,844	785,608	6,959	101,480	20,378	14,840
Noble	20,144	574,494	5,017	86,511	12,258	9,672
Ottawa	4,577	139,027	1,088	41,410	3,667	7,336
Paulding	2,947	66,753	356	7,522	2,307	2,115
Perry	18,057	491,760	4,032	53,255	12,806	10,499
Pickaway	63,523	2,164,112	2,291	36,266	8,402	4,175
Pike	21,954	528,409	3,008	30,592	4,508	2,716
Portage	8,766	339,096	7,875	196,839	34,720	31,264
Preble	35,549	916,967	7,225	163,167	5,171	4,057
Putnam	16,080	323,272	1,506	31,604	5,773	5,141
Richland	25,344	589,837	16,696	409,779	17,657	18,289
Ross	57,063	1,484,646	2,512	23,607	7,586	3,685
Sandusky	15,194	444,355	5,827	154,152	9,103	10,324
Scioto	20,920	656,048	3,482	36,346	4,849	4,902
Seneca	24,392	621,951	12,487	307,125	15,249	16,625
Shelby	20,156	401,813	8,305	183,614	7,780	6,665
Stark	17,892	599,613	14,505	362,499	13,883	16,492
Summit	10,527	405,462	7,931	212,122	17,944	17,047
Trumbull	9,469	397,689	9,063	218,777	47,251	43,823
Tuscarawas	20,547	500,904	12,591	243,528	16,519	15,204
Union	26,201	638,738	2,961	56,907	13,426	12,429
Van Wert	10,356	169,322	914	20,864	4,548	5,220
Vinton	10,633	213,352	1,855	24,435	7,703	5,579
Warren	42,172	536,163	8,118	144,971	9,678	10,773
Washington	23,605	518,538	5,121	75,741	17,143	13,896
Wayne	21,737	614,348	18,764	430,090	17,784	19,384
Williams	11,585	252,253	5,058	122,272	7,090	8,316
Wood	16,291	376,557	4,005	92,581	9,847	10,787
Wyandot	20,542	509,731	3,929	85,215	11,945	10,803
Total	2,027,811	54,614,617	548,019	11,317,561	1,195,560	1,095,489

STATEMENT SHOWING THE CROPS, &c.—Continued.

Counties.	Clover.				Flax.			Potatoes.	
	Acres.	Tons of hay.	Bushels of seed.	Acres plowed under for manure.	Acres (number of).	Bushels of seed.	Pounds of fiber.	Acres planted.	Bushels produced.
Adams	7,874	1,432	878	492	123	904	3,955	283	20,120
Allen	5,226	3,247	3,370	394	3,726	16,808	24,670	590	37,848
Ashland	10,341	8,247	6,564	175	1,671	9,025	3,342	1,064	83,076
Ashtabula	957	1,357	95	168	310	2,969	41,845	1,513	170,500
Athens	1,020	1,740	350	......	170	1,774	12,309	636	39,351
Auglaize	2,250	1,283	823	116	1,459	8,034	2,177	590	16,746
Belmont	7,161	4,673	1,105	233	172	1,212	11,773	801	66,297
Brown	3,001	700	238	223	93	408	4,266	672	42,996
Butler	7,125	1,315	302	2,088	1,527	11,568	8,490	1,228	76,747
Carroll	3,624	2,387	1,415	172	201	2,121	10,740	453	34,820
Champaign	4,998	3,450	1,254	334	1,850	12,978	3,401	624	33,537
Clark	3,278	2,495	843	739	2,247	16,609	72,279	901	54,974
Clermont	2,295	730	92	389	165	1,022	2,534	3,311	84,847
Clinton	1,774	731	106	252	941	4,826	1,315	870	33,193
Columbiana	9,242	8,589	5,393	130	1,036	8,970	19,526	957	78,555
Coshocton	3,235	1,402	781	80	126	665	3,101	757	46,777
Crawford	7,562	9,568	4,956	69	1,131	7,219	10,459	796	53,450
Cuyahoga	676	825	76	49	16	129	1,826	2,607	199,876
Darke	9,019	4,941	1,361	1,558	6,938	39,610	12,654	1,479	26,240
Defiance	4,444	4,198	1,292	613	353	2,498	33,005	548	33,386
Delaware	2,802	2,768	808	122	4,702	27,073	1,041,521	747	28,903
Erie	3,748	3,783	2,268	650	5	57	312	987	94,744
Fairfield	4,750	2,530	1,553	249	200	1,041	5,805	907	47,297
Fayette	890	96	4	54	414	3,624	1,950	185	14,598
Franklin	2,309	1,644	321	91	409	3,827	6,003	2,540	109,069
Fulton	4,591	5,276	2,921	474	131	826	13,876	696	69,409
Gallia	1,166	356	32	220	112	641	5,842	603	45,368
Geauga	614	515	7	12	130	1,395	6,547	889	89,402
Greene	4,241	2,408	381	694	3,721	23,995	225,606	811	49,278
Guernsey	1,123	635	125	10	222	1,312	6,728	460	21,951
Hamilton	2,863	1,884	61	533	18	157	405	4,556	309,495
Hancock	8,938	7,567	6,311	650	800	5,839	7,079	895	65,091
Hardin	2,596	1,943	739	113	1,230	5,491	630	515	25,669
Harrison	2,106	1,588	256	......	98	642	3,866	361	19,221
Henry	1,320	1,230	747	104	210	1,013	21,245	438	32,179
Highland	2,708	735	379	192	199	1,087	6,918	600	38,183
Hocking	2,577	770	443	229	269	1,728	9,458	517	26,654
Holmes	9,197	6,126	4,549	1,200	240	1,596	6,375	719	48,747
Huron	7,869	7,377	4,672	508	588	4,675	14,277	1,125	90,596
Jackson	783	55	19	106	142	702	4,756	423	27,782
Jefferson	4,724	4,095	632	45	70	506	4,515	580	35,072
Knox	3,979	3,085	213	105	2,254	12,719	23,924	892	67,476
Lake	1,453	2,161	477	224	57	520	16,042	1,826	187,684
Lawrence	1,861	474	144	296	86	148	2,223	423	27,052
Licking	2,727	1 818	407	279	307	2,015	9,624	1 011	60,746
Logan	4,793	3,578	1,838	472	2,258	14,423	1,598	543	29,354
Lorain	1,601	1,736	916	19	50	534	1,361	1,232	107,578
Lucas	1,994	2,208	1,578	222	58	507	7,300	1,119	107,082
Madison	586	585	2	20	878	6,689	161	313	14,083
Mahoning	6,305	7,171	5,522	49	3,263	25,024	106,550	1,030	84,550
Marion	5,121	4,789	3,202	145	1,066	6,797	39,288	565	22,111
Medina	6,409	6,777	4,652	84	1,005	7,620	26,578	1,055	81,134
Meigs	1,162	427	110	411	151	845	7,892	936	58,391
Mercer	4,522	2,965	1,393	805	3,581	19,322	3,502	653	21,552
Miami	7,103	3,086	1,217	1,527	4,769	36,565	209,150	863	36,977

STATEMENT SHOWING THE CROPS, &c.—Continued.

COUNTIES.	CLOVER.				FLAX.			POTATOES.	
	Acres.	Tons.	Bushels of seed.	Acres plowed under for manure.	Acres (number of).	Bushels of seed.	Pounds of fiber.	Acres planted.	Bushels produced.
Monroe	2,511	1,239	919	62	270	1,777	20,544	712	39,238
Montgomery	17,455	6,870	2,486	3,868	5,151	37,506	38,368	1,168	61,604
Morgan	2,385	1,837	710	77	193	1,523	12,720	530	29,793
Morrow	2,996	3,469	1,598	54	3,651	23,258	24,345	704	28,153
Muskingum	3,444	2,409	585	185	187	1,183	4,860	1,487	89,806
Noble	2,205	1,092	348	62	245	1,360	15,155	505	26,840
Ottawa	751	927	532	121	6	49	5,335	723	55,284
Paulding	544	480	36	92	264	878	19,133	178	8,925
Perry	2,215	775	573	103	314	1,794	9,007	598	28,651
Pickaway	4,294	678	526	86	30	212	1,207	447	23,081
Pike	661	121	10	146	158	721	5,148	426	22,149
Portage	4,002	4,635	1,426	135	1,910	16,761	363,857	1,599	146,269
Preble	12,034	2,243	1,089	2,940	4,879	36,262	629	440	20,286
Putnam	2,278	1,828	1,790	225	445	2,743	3,612	684	29,754
Richland	13,679	11,536	6,165	341	3,300	16,009	3,549	1,161	96,019
Ross	3,942	419	17	828	92	383	4,436	659	34,013
Sandusky	7,293	6,906	6,685	374	241	2,261	18,018	981	75,273
Scioto	1,169	192	55	270	124	462	3,401	1,046	38,696
Seneca	13,717	11,695	9,381	948	572	3,031	6,159	1,224	76,121
Shelby	2,843	1,899	729	378	2,330	12,019	1,682	675	37,312
Stark	20,721	20,063	7,603	814	1,419	11,379	309,820	1,212	113,206
Summit	8,849	9,514	3,573	3,410	392	1,632	125,034	1,088	104,638
Trumbull	1,734	2,225	433	20	2,707	21,772	235,063	1,587	179,359
Tuscarawas	10,431	9,804	3,403	342	609	4,109	7,393	1,017	49,897
Union	2,442	1,692	121	116	1,043	5,561	81,033	571	25,208
Van Wert	2,960	2,923	1,555	173	2,595	17,127	1,394	335	14,077
Vinton	140	52	76	20	187	1,111	10,836	336	18,562
Warren	3,412	1,066	234	681	1,495	9,983	4,674	1,122	58,515
Washington	3,088	1,969	862	250	286	1,638	18,096	1,556	88,948
Wayne	16,187	16,231	8,607	202	1,142	12,397	7,069	1,326	98,679
Williams	8,515	8,900	3,552	298	332	2,602	3,648	631	46,035
Wood	3,329	3,671	2,970	98	391	3,076	82,470	739	58,984
Wyandot	5,025	4,564	2,764	204	262	1,341	1,901	623	46,310
Total	403,884	301,475	151,606	37,111	95,170	624,224	3,582,170	80,785	5,297,498

STATEMENT OF THE CROPS, &c,—Continued.

Counties.	Tobacco. Acres planted.	Tobacco. Pounds produced.	Butter. Number of pounds.	Cheese. Number of pounds.	Stone Coal. Bushels mined.	Pig Iron. Tons manufactured.	Sorghum. Number of acres.	Sorghum. Pounds of sugar.	Sorghum. Gallons of syrup.
Adams	389	229,205	204,199	3,452			530	898	41,860
Allen	41	24,019	269,465	11,643			229	881	12,912
Ashland	17	7,929	720,491	129,979			251		13,741
Ashtabula	225	283,695	963,725	3,092,226			15	220	1,259
Athens	643	683,370	272,559	49,317	2,414,700		634		75,961
Auglaize	62	31,197	130,903	1,641			143	114	4,818
Belmont	2,576	2,248,944	480,424	11,771	1,466,937	2,400	748	1,260	74,415
Brown	3,594	2,684,503	264,984	5,924			602	1,386	5,623
Butler	1,018	887,441	368,894	1,986			394	790	43,734
Carroll	4	2,405	343,576	6,217	148,165		190	161	12,796
Champa'gn	101	52,417	359,199	31,168			281	97	17,570
Clarke	129	102,865	236,019	8,256			336	201	27,863
Clermont	1,683	1,066,756	240,341	1,265			776	333	57,718
Clinton	327	199,328	281,431	16,361			839	242	55,500
Columb'na	24	6,020	398,717	76,231	1,327,024		198	329	11,103
Coshocton	52	24,773	334,127	2,909	702,730		612	287	43,429
Crawford	29	13,188	390,106	1,229			185	9	10,132
Cuyahoga	3	4,670	666,630	959,719			57	260	5,995
Darke	941	528,499	335,773	1,941			418	196	16,291
Defiance	237	139,898	220,655	8,765			200		13,852
Delaware	82	43,197	385,040	8,752			259	96	17,804
Erie	49	38,236	236,820	22,070			178	775	18,697
Fairfield	224	152,979	362,735	8,110			604		42,347
Fayette	89	53,164	161,976	2,355			310	63	28,770
Franklin	112	25,515	329,392	10,274			976	609	44,119
Fulton	15	10,032	352,044	26,614			163	150	11,858
Gallia	213	124,028	204,354	15,739	252,310		769		61,888
Geauga	11	8,141	534,234	4,095,584			1	26	163
Greene	1,580	1,319,943	365,415	1,160			445	350	31,285
Guernsey	3,113	869,282	308,945	6,473	159,072		791	320	60,986
Hamilton	191	119,203	265,394	720			234	1,895	17,899
Hancock	15	5,174	449,508	6,276			281		18,499
Hardin	13	7,289	166,239	4,593			60	290	3,076
Harrison	50	34,262	313,233	6,317	289,755		328	5	26,248
Henry	10	2,989	128,900				190	3,369	
Highland	409	242,445	247,365	8,041			851	674	81,741
Hocking	563	334,194	188,858	1,876	661,975	1,142	559	60	42,370
Holmes	15	8,990	447,300	11,860	75,200		324	410	23,690
Huron	48	51,458	915,958	47,134			231	81	19,327
Jackson	54	17,393	143,487	26,356	284,793	9,185	520	1,542	36,598
Jefferson	18	10,243	294,163	11,170	1,414,635		279	198	18,556
Knox	106	75,567	469,268	10,406			336	8	21,406
Lake	74	66,790	467,870	229,882			65	10	7,481
Lawrence	295	268,512	106,254	11,229	359,317	13,655	441	445	32,925
Licking	128	85,403	507,060	48,054	1,760		513	146	45,325
Logan	58	29,081	322,152	4,487			177	100	13,748
Lorain	18	23,098	816,121	1,007,467		1,250	204	15	24,112
Lucas	74	37,469	169,068	16,918			82	120	5,258
Madison	16	9,018	138,714	29,440			344	637	16,098
Mahoning	6	5,025	488,330	105,537	2,280,788		31	7	2,123
Marion	15	6,258	253,511	2,334			133	97	7,107
Medina	43	32,237	714,925	627,354	4,000		59		3,349
Meigs	82	47,109	238,264	36,596	7,494,088		731	70	60,076
Mercer	56	23,494	150,482	11,820			218		7,882
Miami	1,333	1,045,154	282,553	7,895			386	470	27,772

STATEMENT OF THE CROPS, &c.—Continued.

COUNTIES.	TOBACCO.		BUTTER.	CHEESE.	STONE COAL.	PIG IRON.	SORGHUM.		
	Acres planted.	Pounds produced.	Number of pounds.	Number of pounds.	Bushels mined.	Tons manufactured.	Number of acres.	Pounds of sugar.	Gallons of syrup.
Monroe	4,600	3,364,603	230,174	81,898	36,772	......	627	185	51,456
Montgom'y	7,253	7,720,223	360,988	800	......	......	497	......	40,870
Morgan	1,373	1,761,569	291,628	17,414	98,217	......	676	195	72,501
Morrow	15	9,565	388,330	717	......	......	212	295	13,217
Musking'm	63	37,229	463,722	5,244	1,362,927	......	813	93	82,377
Noble	5,107	4,399,168	317,770	18,067	199,197	......	805	187	77,278
Ottawa	8	3,674	66,671	7,111	......	......	50	179	3,122
Paulding	8	2,865	71,366	440	......	......	39	......	2,958
Perry	422	235,451	346,316	4,632	812,634	......	553	140	47,572
Pickaway	41	19,851	195,612	1,619	......	......	394	......	34,428
Pike	94	52,604	74,461	799	......	......	459	275	32,438
Portage	22	16,100	800,419	2,879,837	1,125	......	35	15	2,862
Preble	1,394	1,114,029	338,685	3,476	......	......	409	20	31,796
Putnam	56	21,271	187,139	2,622	......	......	163	......	3,849
Richland	52	29,551	570,685	6,273	......	......	308	15	14,038
Ross	165	70,239	215,720	8,571	......	......	552	310	33,128
Sandusky	14	8,345	228,880	1,850	......	......	293	301	24,839
Scioto	63	33,755	100,050	967	28,750	23,072	371	217	29,091
Seneca	32	13,379	458,175	10,919	......	......	308	217	23,935
Shelby	492	321,421	222,222	1,929	......	......	196	24	10,476
Stark	111	68,868	623,227	23,112	1,226,313	......	174	104	11,998
Summit	33	25,056	647,224	1,403,072	793,368	......	93	342	6,511
Trumbull	29	26,546	1,267,931	3,521,903	1,331,070	......	11	30	683
Tuscaraw's	107	52,931	511,938	59,362	562,510	......	440	1,736	30,078
Union	25	13,951	275,072	83,127	......	......	136	6	7,707
Van Wert	47	12,087	186,177	1,535	......	......	130	......	5,649
Vinton	222	121,898	77,208	2,624	93,136	......	385	......	32,356
Warren	1,689	1,400,745	301,820	6,312	......	......	605	709	55,333
Washi'gt'n	2,318	1,546,516	379,194	31,978	141,231	......	972	......	90,976
Wayne	64	39,906	664,268	23,175	863,400	......	207	54	12,008
Williams	31	8,541	358,354	13,525	......	......	143	99	7,223
Wood	9	4,740	251,856	11,011	......	......	337	894	18,633
Wyandot	31	12,152	239,852	1,936	......	......	151	15	9,147
Total	47,262	37,022,323	31,121,275	19,130,750	26,887,899	50,704	31,255	27,359	2,347,578

STATEMENT OF THE CROPS, &c.—Continued.

Counties.	Maple Sugar. Number of pounds.	Maple Sugar. Gallons of syrup.	Dogs. Number.	Sheep Killed. Number.	Sheep Killed. Value.	Sheep Injured. Number.	Sheep Injured. Estimate of injury done.	Aggregate value of sheep killed and wounded.
Adams	19,434	4,665	2,054	631	$1,996 00	169	$351 00	$2,347 00
Allen	57,519	3,570	2,295	244	704 50	168	323 50	1,028 00
Ashland	170,999	37,928	1,869	308	995 00	294	455 00	1,450 00
Ashtabula	348,576	1,273	1,416	220	873 50	163	206 00	1,079 50
Athens	22,310	1,967	1,593	407	1,540 00	107	209 00	1,749 00
Auglaize	44,148	2,015	1,401	286	680 00	149	207 00	887 00
Belmont	19,572	6,013	3,017	625	2,247 00	759	1,793 00	4,040 00
Brown	7,765	2,246	2,529	381	1,356 00	207	427 00	1,783 00
Butler	19,930	13,433	2,972	311	1,746 50	62	148 50	1,895 00
Carroll	7,672	1,081	1,586	153	366 00	186	308 00	674 00
Champaign	128,662	8,086	2,376	517	2,261 00	463	1,388 00	3,649 00
Clarke	13,996	2,082	1,944	393	1,415 00	281	833 00	2,248 00
Clermont	1,959	1,417	2,039	354	1,480 00	143	245 00	1,725 00
Clinton	112,299	7,179	2,432	386	1,449 00	279	458 00	1,907 00
Columbiana	89,291	7,469	2,313	264	848 75	324	490 00	1,338 75
Coshocton	31,184	2,475	2,644	398	1,288 00	274	399 00	1,687 00
Crawford	63,376	3,763	2,044	518	1,647 50	543	549 00	2,196 50
Cuyahoga	124,424	2,892	1,439	468	1,483 50	221	325 00	1,808 50
Darke	63,506	9,328	4,591	225	728 00	123	229 00	957 00
Defiance	32,929	1,008	1,166	144	406 00	66	63 00	469 00
Delaware	139,140	12,577	1,928	343	1,145 00	362	788 00	1,933 00
Erie	15,056	391	617	257	955 00	151	570 00	1,525 00
Fairfield	75,737	6,838	3,223	571	1,913 00	425	681 50	2,594 50
Fayette	3,361	734	1,840	442	1,485 00	345	460 00	1,945 00
Franklin	29,296	3,515	2,523	430	1,809 00	652	1,109 00	2,918 00
Fulton	25,152	1,068	1,265	239	668 50	107	141 00	809 50
Gallia	11,683	1,775	2,146	599	1,443 00	119	210 50	1,653 50
Geauga	479,265	1,698	936	197	565 50	63	109 00	674 50
Greene	94,821	12,165	2,155	436	1,757 00	319	800 00	2,557 00
Guernsey	9,944	1,295	2,050	362	1,042 00	313	757 00	1,799 00
Hamilton	1,498	2,687	4,816	95	499 00	34	126 00	625 00
Hancock	135,467	5,793	2,710	362	1,101 00	283	491 00	1,592 00
Hardin	102,039	5,684	1,648	277	849 00	112	216 00	1,065 00
Harrison	15,065	6,649	1,590	209	717 00	171	386 00	1,103 00
Henry	16,904	2,845	785	53	185 00	10	30 00	215 00
Highland	42,891	4,144	2,710	567	1,867 00	290	527 00	2,394 00
Hocking	13,591	1,700	2,048	232	663 00	103	151 50	814
Holmes	57,640	2,820	1,904	274	842 00	367	470 00	1,312
Huron	123,789	2,078	2,145	288	1,019 50	876	319 00	1,338 50
Jackson	4,042	378	3,109	354	869 50	91	141 00	1,010 50
Jefferson	13,129	5,702	1,669	499	1,745 00	321	624 00	2,369 00
Knox	142,671	7,762	2,383	478	1,747 00	425	807 50	2,554 50
Lake	82,874	626	615	228	594 00	64	116 00	710 00
Lawrence	3,802	407	2,420	354	680 00	44	98 00	778 00
Licking	193,311	10,681	4,477	588	1,894 00	721	966 00	2,860 00
Logan	350,174	11,070	2,132	374	1,584 00	292	694 00	2,278 00
Lorain	155,804	1,509	1,689	401	1,354 00	336	544 00	1,898 00
Lucas	3,346	75	997	231	645 00	92	113 00	758 00
Madison	4,284	318	1,609	484	1,882 00	358	433 00	2,315 00
Mahoning	178,146	12,014	2,200	432	1,330 00	841	1,080 00	2,410 00
Marion	50,252	1,970	1,695	402	1,346 00	753	1,079 00	2,425 00
Medina	283,845	6,900	1,735	149	562 00	211	269 00	831 00
Meigs	14,721	1,000	2,192	462	1,118 00	79	124 00	1,242 00
Mercer	32,334	2,593	2,032	207	501 00	61	139 00	640 00
Miami	59,613	11,678	2,441	430	1,620 00	144	276 00	1,896 00

STATEMENT OF THE CROPS, &c.—Continued.

COUNTIES.	MAPLE SUGAR.		DOGS.	SHEEP KILLED.		SHEEP INJURED.		Aggregate value of sheep killed and wounded.
	Number of pounds.	Gallons of syrup.	Number.	Number.	Value.	Number.	Estimate of injury done.	
Monroe	14,599	1,088	2,759	577	$1,537 50	209	$372 00	$1,909 50
Montgomery	117,146	19,422	3,177	295	1,045 00	39	89 00	1,134 00
Morgan	13,444	1,551	1,973	378	1,216 50	328	506 50	1,723 00
Morrow	126,434	6,437	1,618	217	891 00	311	572 00	1,463 00
Muskingum	8,885	2,250	3,322	815	2,531 00	439	693 00	3,224 00
Noble	11,178	2,100	2,503	517	1,364 00	226	355 00	1,719 00
Ottawa	6,648	326	706	177	501 00	72	140 00	641 00
Paulding	16,160	971	656	82	198 00	7	5 00	203 00
Perry	39,285	6,023	1,911	351	1,250 00	211	589 00	1,839 00
Pickaway	21,732	3,609	3,016	448	1,714 00	336	757 00	2,471 00
Pike	7,460	8,694	1,625	417	1,155 00	40	70 00	1,225 00
Portage	404,117	8,812	1,559	274	996 00	277	466 00	1,462 00
Preble	61,179	10,253	2,585	294	1,243 00	130	243 00	1,486 00
Putnam	39,696	1,953	1,332	403	1,103 00	132	81 00	1,184 00
Richland	152,384	10,785	2,828	560	2,024 00	316	605 00	2,629 00
Ross	35,296	8,726	3,501	755	2,150 00	276	565 00	2,715 00
Sandusky	20,456	1,173	1,597	186	499 00	132	181 00	680 00
Scioto	5,769	616	1,370	637	1,476 00	166	84 00	1,560 00
Seneca	80,564	2,923	2,107	336	1,249 00	270	553 00	1,802 00
Shelby	36,945	3,507	2,290	238	848 00	197	355 00	1,203 00
Stark	84,805	7,146	3,179	556	1,704 50	426	810 00	2,514 50
Summit	104,990	2,741	1,384	390	1,399 00	121	289 00	1,688 00
Trumbull	263,373	12,821	1,648	428	1,567 50	674	1,020 00	2,587 50
Tuscarawas	35,819	3,616	3,190	476	1,472 75	395	660 50	2,133 25
Union	254,252	7,582	1,669	220	829 00	172	418 00	1,247 00
Van Wert	27,886	1,370	1,259	158	393 00	29	45 00	438 00
Vinton	20,807	1,225	1,302	313	1,021 00	68	103 00	1,124 00
Warren	123,412	18,203	1,966	413	1,871 00	323	696 00	2,567 00
Washington	13,562	2,325	3,469	513	1,436 00	267	481 00	1,917 00
Wayne	97,540	6,363	2,472	331	1,160 00	355	511 00	1,671 00
Williams	87,727	2,878	1,645	202	532 00	174	419 00	951 00
Wood	34,359	1,687	1,541	280	734 00	149	176 00	910 00
Wyandot	40,901	4,401	1,701	399	1,988 00	474	1,256 00	3,244 00
Total	6,753,048	444,606	185,034	32,175	106,607 00	22,657	39,419 00	146,026 00

The analyses of the statistics for 1863 were computed from the returns made to this office by the county auditors. The aggregates thus returned have not always corresponded with the aggregates returned to the State Auditor. The first column of Table XXIV., page cxxvii, was taken from the State Auditor's aggregates, but the *per centages* and the seven other columns of the same table were computed from the aggregates on pages cxxx and cxxxi, as returned to this office. The difference in these returns is not sufficiently great to affect the *per centages* to any considerable extent.

Respectfully submitted,

JOHN H. KLIPPART, *Cor. Sec.*

STATE AGRICULTURAL ROOMS,
COLUMBUS, O., Dec. 16, 1864.

PROCEEDINGS OF THE BOARD.

November, 1862.

At a special meeting called by the Governor, to consult upon the propriety of accepting a land grant for an Agricultural College, the following was submitted to the Governor as the sense of the Board:

To his Excellency, David Tod, *Governor of Ohio:*

The Ohio State Board of Agriculture having been summoned by you to consult upon the subject of accepting the appropriation of the 37th Congress, to private college for the benefit of Agriculture and the Mechanic Arts, approved July 2d, 1862, having considered your communication of facts and views, respectfully recommend the acceptance of the grant, under the provisions of said act, by the Legislature of the State, and the early establishment of the college contemptated. The Board further desires to express their willinngess to co-operate with the State officers and Legislature in measures calculated to promote the interests of Agriculture and the Mechanic Arts, including such attention to military tactics as shall comport with the exigency of the times, and advance the practical education of the industrial classes in the several professions and pursuits of life.

Columbus, January 6, 1863.

Board all present except J. M. Millikin and H. B. Perkins.

The day spent in considering the commended list of premiums.

Messrs. Townshend and Potwin were appointed a committee to examine the Treasurer's and Corresponding Secretary's accounts.

Messrs. Turney and Egbert were appointed a committee to examine the Executive Committee's account. After due examination the committee reported as follows:

The undersigned committee appointed by the State Board of Agriculture to examine the accounts of the secretary and treasurer, find on examination that the amount received up to this date by the treasurer is $15,349 69. Amount paid as per vouchers on file, $15,004 71; showing a balance in the hands of the treasurer of $344 98.

The above does not include the whole amount of receipts and disbursements of the executive committee, as seen by their accounts.

N. S. TOWNSHEND,
C. W. POTWIN,
Committee.

The undersigned committee have examined the accounts with the vouchers of the executive committee, for the year 1862, and find them correct.

NOTE.—The following was omitted above, and should follow the treasurer's statement. Also that the accounts of the Corresponding Secretary are correct, and that there is due him from the Board the sum of three hundred and six dollars and sixty-three cents.

We find a balance duet Mr. Dewit of			$21 28
And the account due		Baldwin, Dewitt, & Co	527 75
"	"	George Worthington & Co	274 09
"	"	Wm. Bingham	50 24
"	"	Parrish & Knight	10 89
"	"	Mr. Outhwait	25 00
"	"	Goodale & Co	15 00
	"	Columbus Machine Co	80 00
Making			$1,032 25

The above bills are correct, and we recommend their payment.

N. J. TURNEY,
JACOB EGBERT,
Committee.

THURSDAY, January 8th, 1863.

The Board met in Agricultural Rooms.

Members all present except H. B. Perkins and Wm. R. Putnam.

The following officers for 1863 were chosen by ballott: N. S. Townshend, President; D. McMillan, Secretary; J. H. Klippart, Corresponding Secretary; David Taylor, Treasurer.

On motion, it was

Resolved, That hereafter moneys received from all sources, before being paid out, shall pass into the hands of the treasurer, and be paid out only on his order.

On motion, Dr. Townshend and T. C. Jones were appointed a committee to draw up and present to the Legislature a memorial with reference to the establishment of agricultural colleges.

In reference to the difficulties in the Agricultural Societies in Ashland county, it was agreed that the matter be referred to T. C. Jones for final adjustment.

On motion, it was

Resolved, That all the arrangements for the fair shall be made by the Executive Committee, and no moneys received by them shall be paid out except upon the order of its Chairman.

On motion, the meeting adjourned to meet at the call of the President.

D. McMILLAN, Secretary.

MEETING AT THE ANGIER HOUSE.

CLEVELAND, April 21, 1863.

Members all present, viz: Messrs. Townshend, McMillan, Taylor, Dewitt, Perkins, Gardner, Jones, Turney, Putnam and Klippart.

On motion, it was

Resolved, That the bond presented by the citizens of Cleveland as a bonus to hold the Fair in this city in September, 1863, be accepted.

On motion, it was

Resolved, That the Fair for 1863 be held on the 15th, 16th, 17th, and 18th days of September next.

Resolved, That the Secretary be instructed to charge one dollar for the first entry of sheep, and fifty cents for each additional entry, (5 ewes or 5 lambs are to be regarded as one entry only.)

Ordered, that the pedigrees of animals (horses and cattle) be delivered to the Secretary at the time of making the entry.

Ordered, that no animal will be admitted on the grounds except those regularly entered for exhibition.

Ordered, that if horses are entered for exhibition, and are not exhibited when called for by the Superintendent, they shall be charged for forage and stable room at the rate of one dollar per day.

Ordered, that the heading of "Short Horns," in the first department, be stricken out, and "Thoroughbred Cattle be substituted therefor.

Ordered, that the Devon list be stricken out.

Ordered, that all classes of horses except *thoroughbred*, the premiums on aged stallions be $40; and $20 on second best; on stallions between 3 and 4 years, the premium be $20; that in the class of Draft Horses, the premiums on stallions be the same as on Mares.

Ordered that the class of Match Horses and Mares read as follows:

Best pair of coach horses	$20
2d best " "	10
Best " farm or draft horses or mares	20
2d best " " "	10
Best " matched roadsters	20
2d best " " "	10

Ordered, that the Secretary be authorized to charge an additional fee for making entries of cattle and horses, whose pedigrees are to be published in a pamphlet for distribution on the Fair Grounds. Parties are requested to state in addition to the pedigree, the age, color, name of animal, and also whether the animal is for sale or not. All entries intended to be published in this catalogue must be made by the first of September.

Ordered, that the Sweep-stake premium on horses be as follows:

Best stallion of any age or breed	$50
Best mare " "	50

Ordered, that the class of Jacks and Mules be changed so as to read as follows:

Best Jack, 3 years old and over	$25
" 2 years old and under 3	15
" 1 year old and under 2	5
Best Jennet, 3 years old and over	15
" 2 years and under 3	10
" 1 year and under 2	5
Best pair of mules, 2 years old and over	10
Best pair of mule colts	5

Ordered, that the words "and grades," be stricken from all classes of sheep.

Ordered, that the second premiums be stricken from all classes of sheep except the Merinos.

Ordered, that the premium for the best fleece of wool be stricken from all the classes of sheep.

Ordered, that the class of Long Wools be divided as follows:

LONG WOOL SHEEP—LEICESTERS.

Best buck, 2 years old and over	$15
" under 2 years old	15
Best pen of five ewes, over 2 years old	15
" " under 2 years old	15
" five lambs, regardless of sex	10

LONG WOOL SHEEP—COTSWOLDS.

Best buck, 2 years old and over	$15
" under 2 years old	15
Best pen of five ewes over 2 years old	15
" " under 2 years old	15
" five lambs, regardless of sex	10

Ordered, that the following be the premiums offered for Cashmere goats:

Best thoroughbred billy-goat	$10
2d best " "	5
Best thoroughbred nannie-goat	5
2d best " "	3
Best " 3 kids	5
2d best " "	3

Ordered, that in the classes of large and small breeds of hogs, the premiums above $5.00 be each reduced to $5.00, and that second premiums be offered in the class of small breeds.

Ordered, that in Class II. of the Fourth Department, there be offered the following premiums:

Best 10 pounds dressed flax	$5
" 5 " bleached flax	2
" 5 " flax cotton	5
" 5 " flax yarn	5
" 5 " of cotton grown in Ohio	10

Ordered, that a premium of $40.00 be offered for the best ten pounds of Sorgho sugar, made on the grounds during the Fair.

Ordered, that the following lists and premiums for flowers be adopted:

PROFESSIONAL LIST.

STOVE AND GREEN-HOUSE PLANTS IN BLOOM.

Best collection of not less than 20 varieties, variety and growth being taken into consideration	$10
2d best ditto	5
Best 12 varieties do	5
2d "	3
Best 6 varieties do	3
2d "	1
Best specimen plant in or out of bloom	3
Best collection of not less than 10 varieties of variegated leaved plants, in or out of bloom	5
2d best do	3
Best single specimen	1
" collection of aloes and cactus in pots	2
" collection fuchsias in pots, growth and variety taken into consideration	3
2d best do	2

Best collection geraniums in bloom, not less than 10 vases	$3
2d best do	2
Best collection gloxinias and achimenes	2
" collection ferns and lycopodiums	3
2d best " "	2
Best and largest collection verbenas grown in pots, growth and bloom particularly considered	3
2d best do	2
Best and greatest variety petunias in pots	2
Best display asters	2
" gladiolas	2

All plants in the above list should be exhibited in the pots in which they were grown, making allowance for the necessary shifts.

CUT FLOWERS.

Best display dahlias, not less than 20 named varieties	$5
2d do	2
Best 12 varieties dahlias, named	3
2d " "	1
Best and greatest display of verbenas, named	3
2d " " "	2
Best and greatest display of roses, named	3
2d " " "	2
Best and greatest display cut flowers in variety and quality other than above	3
2d do	2
Best display of coxcombs and amaranths	2
2d " " "	1
Best pair parlor boquets, without regard to style	2
2d do	1
Best pair hand boquets, without regard to style	2
2d do	1

AMATEUR LIST.

Same as in Professional List.

OPEN TO ALL.

Best floral ornament	$5
2d " "	3
Best and most beautifully arranged basket of flowers, for table	3
2d do	2
Best and most beautifully arranged basket of flowers, for hanging	3
2d do	2

J. H. KLIPPART,
Cor. Sec'y.

The Ohio State Board of Agriculture, at the meeting held in Cleveland, April 21st, 1863, placed upon their record this memorandum:

Jacob Egbert, a member of this Board, having departed this life since

our last meeting, the members now assembled embrace this opportunity to express the high respect and esteem with which we have always regarded him, as a high-minded and honorable man; an efficient member of this Board; a liberal and enterprising agriculturist, and a true-hearted and generous friend.

Resolved, These proceedings be entered upon our journal, and a copy of the same be forwarded to his friends, with the assurance of our sympathy in their affliction.

Resolved, That an obituary notice of the deceased be prepared by the Secretary, and published in the next volume of Reports.

On motion, H. B. Perkins was elected President *pro tem.*

On motion, ordered, that the Corresponding Secretary get as many premium lists printed as he can for $200, and as many posters for a like sum as possible.

Resolved, That the Treasurer of the Ohio State Board of Agriculture be, and hereby is authorized to collect the Cleveland subscription for 1863.

Resolved, That Messrs. Perkins and Dewitt be authorized to collect immediately the remaining $459 on the bond of 1862, deducting, if they see proper, not exceeding $50, for collection.

On motion, Mr. Klippart was authorized to publish a catalogue of thoroughbred horses and cattle that may be entered for competition, provided exhibitors are willing to incur the expense.

CLEVELAND, O., April 22d, 1863.

Ohio State Board of Agriculture met pursuant to the call of the President, at the Angier House. Members present: Townshend, Jones, Gardner, Dewitt, Perkins, Taylor, Turney, Putnam and McMillan.

The consideration of the controversy existing between the rival societies in Ashland county was taken up, and after hearing the statement of the parties representing the different societies, upon the resolution of Mr. Gardner the Board made the following disposition of the matter:

Resolved, That neither of the Agricultural Societies in Ashland county are legally organized.

Resolved, That the friends of agriculture in Ashland county, to settle the unfortunate controversy between the rival societies, are requested to meet at the Court House in Ashland on the 6th day of June next, between the hours of 1 and 4 P. M., and organize a new society for said county, pursuant to the law and regulations, and that due notice of the meetings be published in the papers of said county.

On motion, it was

Resolved, That there be premiums offered for only one class of thoroughbred cattle.

D. McMILLAN,
Rec. Secretary.

OFFICE OF OHIO STATE BOARD OF AGRICULTURE,
COLUMBUS, O., Jan'y 5th, 1864.

Board met, pursuant to notice. Members present: Jones, Perkins, Dewitt, Turney, Taylor and McMillen.

On motion, T. C. Jones was appointed President *pro tem.*, the President, N. S. Townshend, being absent.

On motion, the commended list of premiums was taken up. The following were noted as being worthy:

FIRST DEPARTMENT.

F. G. Pritchard, Brunswick, O., three steers at one birth, three years old..........	Diploma.
Carroll Merrill, Painesville, O., buck lamb, 5 mos. old	"
N. L. Chaffee, Jefferson, O., best Shropshire buck..........................	"

SECOND DEPARTMENT.

Anderson & Co., Painesville, O., Portable Gage Saw-Mill..........................	Diploma.
Charles Wells, Cincinnati, O., Job Printing Press..........................	"
Wm. Kenyon, Steubenville, O., Gas-pipe Cutter	"
E. K. Wissell, Warren, O., Spoke Machine..........................	"
Charles F. Dertenbach, Cleveland, O., Intestine Cleaner and Turning Machine......	"
Wright & Holman, Cleveland, O., Hominy Machine	"

THIRD DEPARTMENT.

D. M. Sommerville, Cleveland, O., Sewing Machine for Leather..........................	Diploma.
Mrs. A. C. Deveroux, Cleveland, Card Embroidery..........................	"
T. L. Wadsworth, Embroidery and Machine Work..........................	"
Miss E. Craig, Cleveland, O., Wax-work (fruit)	"
William Berger, " "	"
Mrs. S. Newberry, " Knit shawl	"
A. F. Newell, Warren, O., Patent Fruit Boxes	"
W. P. Fogg, Cleveland, Decorated China-ware..........................	"
Mrs. O. L. Hinckley, Brooklyn, O., 10 lbs. Lard	$2 00

On motion, Messrs. Turney, Perkins and Dewitt were appointed to examine the books and vouchers of the Treasurer and Executive Committee.

Adjourned to meet at same place at 7 o'clock P. M.

D. McMILLAN,
Rec. Sec'y.

COLUMBUS, O. Jan'y 6th, 1864.

Board met according to adjournment.

On motion, the bill of Mr. Hurst, a gate-keeper, for 1862, and that of Mr. Huntington, for forage for same year, were audited. Committee on

Treasurer's account reported the balance in the hands of the Treasurer to be $9,982 70.

On motion, the report on sugar evaporators at the late State Fair was taken up, there having been a remonstrance presented by John L. Gill & Son and others, against the payment of the premiums awarded, and asking that the awards be set aside. There appearing no just cause why the above named awards should not have been made, on motion it was ordered that the premiums as awarded be paid.

D. McMILLAN,
Rec. Sec'y.

EVENING SESSION.

Board met and proceeded to the organization of the Board by ballot for 1864, with the following result:. For President, Nelson J. Turney.

On motion the rules were suspended, and Mr. Taylor was elected Treasurer, Wm. F. Greer Recording Secretary, and Mr. John H. Klippart Corresponding Secretary.

On motion, adjourned.

D. McMILLAN,
Rec. Sec'y.

COLUMBUS, O., Jan'y 6th, 1864.

On motion, the premium offered for best half acre potatoes, was awarded to H. V. Bronson, of Peninsula, Ohio.

On motion of Mr. Gardner, the Treasurer was instructed to invest $7,000 in U. S. 5–20's.

On motion of Mr. McMillan, it was resolved that this Board have four regular meetings each year.

The President then appointed the following members as Executive Committee, viz: T. C. Jones, David Taylor and Daniel McMillan.

On motion of Mr. Gardner, the Executive Committee was authorized to purchase from Mr. Klippart such books as they may think expedient.

On motion of Mr. McMillan, it was resolved to hold the next State Fair on September 13th to 16th inclusive.

On motion, adjourned to meet at the call of the President.

WM. F. GREER,
Rec. Sec'y.

In accordance with the resolution authorizing the Board to memorialize the Legislature to accept the grant of land or scrip from Congress, for the

establishment of an Agricultural College, the President (N. S. Townshend) submitted the following memorial, which was placed on the desk of every member of the Legislature:

MEMORIAL OF THE OHIO STATE BOARD OF AGRICULTURE, IN FAVOR OF ACCEPTING THE LANDS GRANTED BY CONGRESS "IN AID OF INSTRUCTION IN AGRICULTURE AND THE MECHANIC ARTS," AND IN FAVOR OF THE SPEEDY ESTABLISHMENT OF AN AGRICULTURAL COLLEGE.

To the Honorable the General Assembly of the State of Ohio:

The "Act for the encouragement of Agriculture," passed Feb. 27, 1846, provides for an "Annual Meeting of the Ohio State Board of Agriculture, together with the President of each County Agricultural Society, or other delegates therefrom duly authorized, for the purpose of deliberation and consultation as to the wants, prospects and condition of the Agricultural interest throughout the State." At a meeting held in accordance with this provision in the city of Columbus on the 8th day of January of the present year, after due deliberation it was voted unanimously that the State Board of Agriculture be requested to address your Honorable body in favor of accepting the grant of land made to the State in aid of "instruction in Agriculture and the Mechanic Arts," and also in favor of establishing one or more institutions, such as the conditions of the grant require, at the earliest practicable period.

The State Board of Agriculture would, therefore, respectfully represent to your Honorable body that the acceptance of the lands, and the establishment of one or more Agricultural and Polytechnic Schools in accordance with the terms of the grant, is not only the wish of the intelligent farmers and artisans of the State, but, in the opinion of this Board, is, in itself, a measure extremely desirable.

The State has ever felt a deep interest in the education of its youth, and has yearly expended millions of dollars to secure that object. It is conceded that the good order, security and happiness of the people, could not be so certainly or so economically obtained by other means, were general education neglected. The State has almost the same interest in the industrial as in the literary education of its population. Not only does the physical as well as intellectual and moral well-being of the people require that their labors be conducted with such skill as to secure a fitting reward, but the State, in its present financial condition, must, of necessity, appropriate a large portion of the earnings of the people to meet current expenses, and actual and prospective indebtedness.

Should it be supposed that all requisite instruction in the various arts of life, can be readily obtained in the shop or on the farm, it may be answered that experience has demonstrated that in regard to education in letters, however valuable home or private instruction may be, it is not the most economical method; neither is it practicable, without public instructions, to make education general or thorough. The same principles are believed to apply to education in the arts, and are so recognized in regard to medicine, arms and some other callings.

Many of the natural sciences are found to have such intimate relations to agriculture and the mechanic arts, that to insure the highest success, these branches of knowledge must be understood and applied. Capital or labor employed in ignorance and consequent disregard of nature's laws, is thrown away; the loss is sustained not only by the individual, but there is a corresponding loss to the State. The necessity of bringing a better knowledge of many of the natural sciences to the aid of agriculture, has become painfully apparent to the members of this Board. It is an indisputable fact that the fertility of the soil of our State is diminishing under the system or want of system pursued. The average production per acre of all our principal crops, has lessened for several years, as the report of this Board to the General Assembly will show. In Ohio agriculture is by far the greatest of our industrial interests; three-fourths of the population of the State are directly dependant upon it for subsistence, and to the same

source a large portion of the remainder is not less certainly, though perhaps less directly, indebted. And yet so unsatisfactory has farming become, that the most enterprising of our young men are continually leaving agriculture for other occupations—a course most detrimental to the general interests of the State. In many European countries agricultural schools have been established, in which the sciences related to agriculture are taught in a practical manner. The utility of such schools is there unquestioned. Polytechnic schools have also been established, in which many of the sciences are taught in their applications to the various arts of life. These schools are highly beneficial, and have contributed largely to give the manufactures of the countries where they are found their acknowledged preeminence.

Your memorialists would further represent that, as the conditions of the grant require that one or more of the institutions contemplated be established within a period of five years, there appears no sufficient reason for withholding the benefits of such institutions beyond the time necessarily required to put them into operation. The financial condition of the State cannot be greatly improved within five years; nor is it probable that the lands granted can be made available except by methods now open to your adoption. But still more, if this form of education can give a better direction to any considerable portion of our industry, under the present burdens of the State, we cannot too soon enjoy its advantages.

Your memorialists are deeply anxious that the noble fund, now intrusted to the State for the purpose of "instruction in agriculture and the mechanic arts," should not be misapplied or perverted to any other use. There are, doubtless, other meritorious objects to which your attention may be directed; but the farmers and mechanics of the State believe they have the right to insist that this grant shall be applied to none other than the purpose specified by Congress, the more especially as this is the first national recognition of the importance of providing technical education for the working classes.

We further pray your Honorable body to give to any and all establishments, under this grant, an organization which will place them to such an extent as you may deem proper, under the direction and management of the industrial interests for whose immediate benefit they were designed, and as far as practicable removed from the influence of political partisanship.

And your memorialists, as in duty bound, will ever pray.

N. S. TOWNSHEND,
President of Board.

CONVENTION OF PRESIDENTS OF COUNTY BOARDS OF AGRICULTURE.

The society convened in the Senate Chamber at 10 o'clock, A. M., January 6th, and was called to order by the President, Hon. Norton S. Townshend.

On motion, the Secretary called the roll of counties, and the following delegates presented their credentials:

COUNTY.	NAME.	RESIDENCE.
Ashland	W. B. McCarty	Ashland.
Ashtabula	Abner Kellogg	Jefferson.
Athens	Geo. Putnam	Athens.
Belmont	J. A. Rinker	St. Clairsville.
Brown	Jackson Dugin	Georgetown.
Butler	Fergus Anderson	Ross.
Champaign	N. H. Harr	Westville.
Clark	Alex. Waddle	South Charleston.
Clermont	Shadrach Dial	Amelia.
Clinton	C. Linton	Wilmington.
Coshocton	Wm. Batchelor	Clarke.
Cuyahoga	E. S. Willard	Cleveland.
Delaware	Robert McKinney	Delaware.
Fairfield	Virgil E. Shaw	Lancaster.
Franklin	Jared Foresman	Columbus.
Geauga	Delos Williams	Burton.
Green	J. R. Nash	Xenia.
Hamilton	John K. Green	Carthage.
Hardin	I. C. Stevens	Dudley.
Harrison	Eli Peacock	Cadiz.
Huron	Giles Boalt	Norwalk.
Jackson	J. Tripp	Jackson.
Knox	C. Delano	Mt. Vernon.
Lake	Geo. Anderson	Painesville.
Licking	James Pittsford	Granville.
Logan	Jas. M. Kauffman	Bellefontaine.
Lorain	N. B. Gates	Elyria.
Lucas	Wm. C. Earl	Toledo.

COUNTY.	NAME.	RESIDENCE.
Madison	Robert Armstrong	London.
Mahoning	Richard Fitch, jr.,	Ellsworth.
Marion	E. Messenger	Marion.
Medina	Wm. H. Witter	Medina.
Miami	Wm. B. McClung	Troy.
Morgan	J. B. Stone	McConnellsville.
Morrow	W. F. Bartlett	Chesterville.
Muskingum	F. A. Seborn	Zanesville.
Noble	Canfield Phelps	Sarahsville.
Pickaway	N. J. Turney	Circleville.
Portage	Thomas Gorby	Randolph.
Preble	H. W. Dooly	Eaton.
Putnam	D. McCurdy	Ottawa.
Richland	A. C. Welch	Mansfield.
Ross	Hugh Bell	Chillicothe.
Sandusky	Platt Brush	Fremont.
Seneca	Lewis Baltzell	Tiffin.
Shelby	J. Duncan	Sidney.
Stark	Jas. A. Saxton	Canton.
Summit	H. P. Canon	Akron.
Tuscarawas	U. C. Deardorff	Canal Dover.
Union	R. D. Reed	Milford Center.
Warren	L. G. Anderson	Franklin.
Wayne	John McClellan	Wooster.
Williams	Wm. N. Noble	Bryan.
Wood	John Bates	Perrysburg.
Wyandot	T. V. Reber	Upper Sandusky.

The President proceeded to speak as follows:

GENTLEMEN—I have been absent from Ohio for nearly the whole of the past year, and, therefore, am not prepared to make a minute or accurate statement of the present condition of the agriculture of the State. For the same reason I will not attempt to indicate the topics which should occupy the attention of the Convention; these matters I may safely leave to other members of the Board who have been able to bestow more thought upon them. I will content myself with offering you, in view of our national struggle, my congratulations on the fact of our meeting, and the favorable circumstances in which we meet.

Happily for us the founders of our State government laid its foundations in justice. Those honest men accepted as true the maxim that a fair day's labor is entitled to a fair day's wages—that "the laborer is worthy of his hire"—and that for securing profitable labor compensation is better than coercion. The institutions of the State reared on such a basis proved attractive to the industrious, the intelligent and enterprising people of older States and countries, and consequently Ohio has now a large and comparatively homogeneous population—peaceful, prosperous and happy. The

States on the South side of the Ohio river, in their beginnings, adopted the policy of obtaining labor by coercion rather than by compensation, and thus unwittingly doomed one portion of their people to idleness and its attendants and the other portion to ignorance and its evils, and made industry, enterprise and thrift impossible.

To-day we can see the opposite results of these different systems, for those that sowed the good seeds of truth and justice have harvested peace and plenty, while those that sowed the wind have reaped the whirlwind. In Ohio our barns are full and our homes are secure—our little children go to the district school and return as merrily as ever, and fathers and mothers pursue their ordinary avocations without fear or molestation. But in the States that adopted coercion there is now famine and terror; their once fruitful fields are uncultivated and their once pleasant homes are desolate, and the people by thousands are fleeing for their lives. It is, I think, impossible for those who have not seen, to conceive how terrible is the ruin that slavery and treason have wrought.

Allow me to congratulate you, then, on the prosperous and happy condition of our State, and upon the peace and security which make such a meeting as this possible. In comparison with the people of many States we enjoy much for which it certainly becomes us to be deeply thankful.

Upon the conclusion of Mr. Townshend's remarks, Mr. Klippart stated that two reports had been submitted from Ashland county—one from Hayesville and the other from Ashland—and asked which he should receive.

Mr. Waddle moved that the papers be referred to a committee of three appointed by the Chair.

The Chairman announced Messrs. Kauffman, McClung and Welch, as said committee.

Judge Jones then spoke as follows:

As there seems to be no business before the Convention claiming immediate attention, I beg leave to say a word or two in regard to the operations of the State Board last year, the present conditions and prospects, and especially in regard to County Societies, upon which this organization depends for its existence.

Four years ago, in obedience to a resolution passed by this Convention, the State Board adopted the system of holding the Fair two years in one place. That was carried out at Dayton, where it was held two years, and subsequently at Cleveland. It had been supposed by this Convention, in passing that resolution of instruction to the Board, that in this way a portion of the expense in fitting up the grounds would be saved and its con-

dition improved. And so it has turned out. Why, at the end of the first year, at Dayton, there was no surplus in our Treasury; but at the end of the second year, with a much smaller attendance—for that was the year memorable for the breaking out of the present war—we had still a surplus in the Treasury. So at Cleveland, a larger surplus has been realized than the Board ever had; as the President said in his opening remarks, it is in the neighborhood of $9,000. But it must be observed that that sum represents all we have. This success in holding the Fairs during the past four years has proved a strong argument in favor of making the system less migratory than before. Now, having this money in the Treasury for the first time since the organization, the question has occurred to the Board—what shall we do beside that which we have been accustomed to do annually? What else can we do towards increasing the efficiency of these organizations—County and State?

We have had under consideration the matter of enlarging the Library. It already contains a large number of volumes, embracing every department of agriculture, and the Board will probably increase the number by some two hundred volumes. We have been corresponding with the Secretaries of other Societies for the purpose of exchanging reports, with a view to their distribution to the County Societies of our State, and in this way suggesting to these Societies the propriety of establishing county libraries for the use of their own members. In this manner the farmers will acquire much valuable information accessible in no other way.

We have proposed, also, that County Societies shall make some provision for the payment of the expenses of the delegates to these Conventions. A few have been in the habit of providing for such expense, but some do not. We should have men come up here annually who will stay and consult and deliberate upon the important questions that come up for consideration. In the State of Maine, poor in its soil and its resources, the members of the Agricultural Society consult together for two weeks, and their expenses are paid by the State out of the public Treasury. There are farmers in this State capable of imparting much valuable information and advice upon questions in which the welfare of the State is deeply concerned, and which come up for legislative action. As it now is, gentlemen are in the habit of coming up here year after year, meeting in the morning to hear the preliminary reports, and, without having time to consider any of the questions of vital importance, are off for home in the evening. Take, for instance, the question presented this morning in the Ashland county case—why, before the committee can decide upon that, this Convention will be ready to adjourn. Now, gentlemen, no Society in the United States has so little influence, considering the number of members, and

considering the fact, as stated by Webster, that Agriculture feeds us and clothes us, and without Agriculture we would have no Commerce—that of these three, Agriculture, Manufactures and Commerce, Agriculture is the hope of the nation. But here in Ohio, the agriculturist is at home considering how best to carry on his business. There is no co-operation; we have nothing to bring us together. We have nothing in the world by which farmers can come together like other classes, or, for instance, by combination so arranged as to make their influence felt—nothing except this organization with its annual Convention of only a day. There are many questions, probably, of State interest touching agriculture, that it would be proper and competent for this Convention to consider. I wish to observe further in regard to this question of our influence, that the Wool Growers' Convention, sitting on yesterday, is a proof of the correctness of what I have said. Why was that isolated from every other branch of agriculture? The reason is because it partakes of the nature of commerce, and has brought capital and energy to its support. Gentlemen are engaged in it largely, and the same enterprise that is exhibited in all branches of trade is manifesting itself there.

This question of the acceptance of the grant of 630,000 acres of land for the endowment of agricultural colleges, offered as a gift to the State of Ohio by the General Government, needs further consideration. At the last Convention the Legislature was recommended to accept the grant, but it was not done. All the other loyal States, except Indiana and Kentucky, have accepted this munificent gift, and many of them have located their lands, principally in Nebraska and Kansas, where a profitable market promises to open at an early day. And here we are behindhand—630,000 acres offered which we do not propose to accept! I hope the Convention will take some action in the matter. As to what shall be done with the grant after it is accepted is another matter altogether.

We have been thinking also of offering a premium for agricultural surveys of counties. These surveys will embrace a description of the soil, products, and particularly of the farm management in different counties, so that farmers shall have their attention called to what is good farm management. We hope, by the comparisons which will result from these surveys, that we shall improve the general condition of agriculture throughout the State. We have supposed, also, that if these Societies improve the time in these investigations, and the advantages afforded by these colleges, agriculture would have greater charms than it has had heretofore. From the birth of this Republic we have been devoted to agriculture, and the greatest men of the country have been born and bred upon farms; but agriculture does not seem to have charms enough to retain them there.

And hence we see the most intelligent and active of our friends flocking to the towns and cities and giving their attention to trades and professions. Now, what we want to do is to so improve agriculture, and so improve the condition of agriculturists, that the most learned and energetic shall remain farmers and give their best intellects and their attainments to the subject of agriculture.

AGRICULTURAL COLLEGE QUESTION.

Mr. GARDNER. In order to make that practicable I offer the following resolution:

Resolved, That the State of Ohio ought to *accept* the grant of land for the establishment of agricultural colleges as soon as possible.

N. B. GATES, of Lorain. It seems that most of the States have accepted this grant made by the General Government, but the State of Ohio seems to remain indifferent to this magnificent offer. I see no reason why she should not accept it. I was reading, quite recently, the annual message of the Governor of Pennsylvania, in which he shows that their colleges are in a very flourishing condition. Although we have advantages as an agricultural State superior to Pennsylvania, yet she is ahead of us. Why do not we accept this grant of land?

I like the remarks of Judge Jones on the various questions presented by him. He is right when he says we ought to spend more time here to discuss agricultural matters. We come in the night time and hardly stay through the following day, and of course very little is accomplished. Now, when we have an election this afternoon members will be rushing home, and that important matter will be neglected. The Ashland county matter ought to be settled and settled at once, and when it comes up again I shall move to have it settled, no matter what the report of the committee may be. [Laughter.] We ought to spend considerable time here to make our influence felt. We do our legislation in one day at railroad speed and accomplish very little. We ought to spend one week here at least—two would be better. The necessary agricultural legislation ought to be thoroughly considered by us, for it is presumed that we understand our business better than those who are not practical agriculturists. The men we elect to fill this Senate Chamber are mostly lawyers, and they meet together for other purposes than the advancement of agriculture. Now, Ohio is an agricultural State, and this great interest ought to be fostered and promoted. Our highest intellects ought to be agriculturists, but such does not prove to be the case. The son who does not love his father's farm goes to a trade or profession, strongly impressed with the belief that farming is an old fogy institution, which, if followed, would not enable

him to go to the Legislature. I am not a practical agriculturist. I was brought up on a farm on the Green Mountains of Vermont until I was 21 years of age, and then cut for the far West. I had a desire to make something of myself in trade, and thus abandoned the farm; but I am now convinced that farming is the best business. Matters, however, are managed badly. In our county we publish an annual report of the proceedings of the Society. Usually the records are kept by an incompetent secretary in pencil, which no one can make out intelligently. This is the way our reports are carried on. Every thing is left to the last day when all is hurry and bustle, and when each one is in eager chase after the dollars and cents, which being secured they rush away. Let us have some action whereby we can create an interest in agriculture.

Mr. McClung of Miami, made some remarks in regard to the action of the General Assembly on the land grant. He said—I am happy to say that the resolution passed by the Convention last year met with a favorble response, and I think the only reason the bill did not pass the Legislature was for the lack of time. This project was one of very considerable magnitude, and members had a hesitancy as to what was best for the acceptance of this grant. A bill was presented to accept the grant, that met the approbation of the agricultural members of both Houses; and the grant would have been accepted, I think, if there hadn't been another year in which to accept it. It was put off with that idea, that it would be accepted by this General Assembly. There was a general disposition to accept the grant if we had known what to have done with it. We wanted to make agriculture occupy a position that would make it felt throughout the State, and attract the attention that is its due. My idea was to have a place to which the farmer's boy could go—a No. 1 place, which would stand as high as our best theological colleges. I think there is no doubt but that this General Assembly will accept that grant. My successor here is a friend to agriculture, and I am sure he will go for it. There is some discussion as to how we shall dispose of this thing; some thinking that we shall be like the boy who drew an elephant at Barnum's Museum—will not know what to do with it.

There is another question that came up before the General Assembly. Parties desired to have the grant divided up in different parts of the State. This was somewhat against the action of the General Assembly, the members being desirous to put the agricultural college as far beyond the influence of political affairs as possible. Now, it looks to me that we ought to have this college in one place. If we divide up the grant and endow several institutions, we will find that we shall have less influence than with one thorough institution. Here lies the one great difficulty in our way—

we do not put forth in any movement a oneness of effort. So, if we undertake to establish two or four colleges we shall fail. After having tried one college, and it shall have proved successful, we can then try another, if thought best. I should like to have gentlemen express their opinions on this subject, as it is a practical question that will come before the General Assembly. If we only get one college and it is a success, then we can have any number more. The Agricultural Committees of both Houses last winter were unanimously agreed on that subject.

Mr. Earl of Lucas. It seems to me that there is another point involved in the resolutions presented; that is, whether the Legislature of this State will agree to accept the donation of a large tract of land for the dissemination of agriculture. I am inclined to think that there is no great difficulty in regard to the acceptance of the grant, but as to how it shall be disposed of when received. It is now the desire of the agricultural interests of the State to accept this donation made by the National Government. Then let the grant be accepted, and if the present Legislature fails in unanimity as to the disposal of the fund, let them leave that to those who may come after them; but do not let them throw away so important a grant. I hope, therefore, the resolution will be adopted, and when the question comes before the Legislature, let the wisest heads get together and mature a plan.

Mr. McClung. The bill before the General Assembly not only involves the acceptance of this grant, but certain conditions that are essential. The act of Congress provides that we cannot accept this grant until we arrange what we are to do with it.

Mr. Gardner. I feel no disposition to censure the last Legislature for the course they pursued in this matter. They were influenced, no doubt, by the action of the late Auditor, who was always watchful of the Treasury of the State. His report was adverse to the acceptance of the grant. And although at that time I felt as I now feel, that the State ought to accept this grant, I have no criticism to pass upon those who thought otherwise. The burdens of that Legislature were onerous, as it was required to consider measures which should enable the State to do its share in carrying on the war. The maturing of an act as asked by this Convention, required a good deal of time and careful consideration, as it involved not merely the acceptance of the grant, but the legislation necessary to put it in practical operation. But this year the situation is different and more auspicious than last. The people seem to carry themselves as if their burdens sat easy upon them. Their faith insures success. And now that peace almost dawns upon us, it is proper to consider this munificent grant, and it becomes the State of Ohio at as early a day as possible to accept it. I hope that the expression of this sentiment upon the part of

this body, may be heard by the Legislature of the State, and that they may take such wise measures as shall secure to us this grant of land. I trust, therefore, that the resolution may pass this Convention unanimously, and that it may also receive the approbation of the Executive Department of the State.

The motion was then put and carried unanimously.]

STATE AGRICULTURAL FUND.

Mr. A. C. Welch, of Richland, offered the following resolution:

Resolved, That the State Board of Agriculture ask the Legislature to appropriate ten thousand dollars to be awarded in premiums at the next Agricultural Fair in the State of Ohio.

Mr. WELCH. One word, Mr. Chairman, in favor of the resolution. Ten thousand dollars from the State of Ohio to pay these premiums is only a drop in the bucket, while that sum in addition to the funds the Board will have, will give such premiums as will induce men to go there who never before have attended a State Fair, and who will bring stock there such as has never been seen at a fair. As it now is, there is not sufficient inducement for this class of men to run the risk of damage and injury to stock, consequent upon railroad transportation, and bring their fine stock for competition at our fairs. The sum, as I have already said, is nothing to the State. In Richland county, in 1863, the people paid $40,000 towards crushing out this infernal rebellion. Now if Richland county can pay $40,000, what cannot the great State of Ohio pay? There are a great many men of this kind in the State who withhold their support from agricultural societies, because there is nothing offered sufficient to attract attention. Every one knows that agriculture is the great interest of the country, that it whitens the seas with the sails of commerce, that it improves and civilizes the vast prairies of the West and builds towns and cities. Why, the gentleman of the Senate who strives to make a popular record, gets his backbone, gets his very style from agriculture. [Applause and laughter]. Let us draw out the best stock and the best products and manufactures from every section of the country. There is Mr. Campbell, of Vermont, the victor at the Hamburg Exhibition, who should be induced to visit Ohio and enter his sheep at our fair. If he comes, we want the ability or means to give him a premium such as no Dutch Count can compete with. [Applause.]

The speaker again stated that the sum would be nothinig for the State to pay, which had never contributed anything towards the encouragement of agriculture save an annual pittance from escheated lands and show licenses. The State—rich in soil and in resources—ought in fact to contribute $20,000 for premiums.

Mr. STEVENS. I do not think we ought to pass this resolution. I do not think it a proper time to add to the taxes of the State, nor is it right to buy these Shylocks of the farm to bring their stock to the fair. It is asking too much of the Legislature. By virtue of the resolution just passed, we are requiring of the General Assembly the appropriation of a large sum in order to secure the benefits of the grant of land for agricultural purposes. The proceeds of the sales of the land are to be invested in bonds, the revenue from which goes to endow the colleges, but before we derive any benefit from the lands the Legislature has got to do something for the erection of buildings. As I said before, the gentleman's resolution asks too much. Last year we asked the General Assembly to kill all the dogs in Ohio; next we ask them to build colleges for us; and now it is proposed to pay the Shylocks of the country for bringing their stock to our fairs.

Judge JONES. I suggest to my friend from Richland, a modification, of his resolution, (and I will send up a substitute to that effect,) so as to ask the Legislature to appropriate annually $3,000 for the payment of the expenses of the office of the State Board, instead of the money we now receive from escheated lands and show licenses, which amount to very little. In the case of escheated lands the heir may appear and recover. That is, under the law as it now stands, the money which we may receive this year from the sale of escheated lands, next year we may be required to pay back; so that some years we do not get anything, while other years we may receive from two to four thousand dollars. And in lieu of this revenue which may be valuable to the State, I propose to ask the Legislature to enact a law appropriating this specific sum of $3,000.

In regard to premiums, I will say that we pay larger premiums than any other society in the country. We do not give pictures, but we pay a bonus. And if the Legislature will give us a fund to pay the office and other necessary expenses, the State Fair will raise enough money for the premiums.

The substitute proposed by Judge Jones was in the following language:

Resolved, That the Legislature be memorialized to appropriate the sum of three thousand dollars annually to defray the expenses of the office of the State Board of Agriculture, in lieu of the fund now provided by law.

PREMIUMS ON CATTLE.

Mr. GATES. I am of the opinion of Judge Jones in this matter. I think in regard to premiums the Fair can take care of itself. I beg leave to offer the following resolution:

Resolved, That the State Board of Agriculture be instructed, in so arranging their annual premium list, as to pay separate and independent premiums on all the different classes of cattle reared in the State of Ohio.

Owing to the wisdom of the State Board they have thrown out all classes except Shorthorns. There is a sort of Shorthorn aristocracy in this State, and, as can plainly be seen, they always come out ahead. [Laughter.] At Cleveland, as usual, I found the Shorthorns represented, but no Devons. What was the result of the State Fair everybody knows. In the early days of the Fair there was a plausible excuse for limiting the premiums to one class, but there is no excuse now. At our home Fair when we came to fill up our cattle stalls, notwithstanding it was late in the season, and cold and unpleasant, there were Devons, Shorthorns and Ayrshires. How was it at the State Fair? There were but about one-half of the stalls filled! I knew how it would be well enough—as usual, Shorthorns carried the day. What did it show? That the interest of agriculture was running down, and that the State of Ohio had become poverty-stricken. [Laughter.] Now, we can well afford to pay premiums on all these classes of stock, but the fact is, as I before stated, they have dwindled down until we have only Shorthorns. We have Hereford men in our county, of whom we are proud. Lorain bears the premium on Hereford cattle, which are certainly the best in one particular, viz: as beef cattle. Give me Hereford beef in preference to Shorthorns. I am a judge of good beef, and a judge of good living also. I hope the Convention will pass this resolution.

Mr. Waddle, of Clark. The gentleman says that no premiums were offered at the last Fair on Devons, Herefords and Ayrshires; I would ask him if there was one offered on Shorthorns?

Mr. Gates. It amounts to the same thing, as all the cattle were of one class.

Mr. John K. Greene of Hamilton Co. At first I felt disposed to favor the motion of the gentleman from Lorain, but it is clear now why it should be defeated. During the two years that I was a member of the State Board we paid for Hereford cattle about twice as much as for Shorthorns.

Judge Jones. I would ask the gentleman if that herd of Ayrshires from Hamilton county was ever paid for?

Mr. Greene. Yes, sir, about twice. [Laughter.] Now, I am in favor of offering a premium on all cattle exhibited of the Pennyroyal breed, [laughter,] and if successful, let the gentleman's Devons and Herefords come in for a share. But a truce to this badinage. The reason that none but Shorthorns are found at the Fairs to receive premiums is because that in this enlightened day of agriculture everybody is ashamed to exhibit anything else but Shorthorns.

Mr. Gates. If the gentleman has any Pennyroyal cattle I hope to see them at the Fair, and that a premium will be offered on them. [Laughter.] But, Mr. Chairman, this is the point I am urging—give the different breeds

of cattle in the State a chance. Hereford cattle stand next to Shorthorns in England, and in regard to beef they stand at the head of the list. So bring on your Ayrshire and Pennyroyal, and let us see those stalls heretofore empty, all filled, and see who should have the premiums for the different kinds.

Judge JONES. I would suggest to the gentleman from Lorain in regard to that resolution, that if the Board considered itself bound by it, it would make a greater number of premiums than we have ever had. There are some Devon and Hereford cattle in the State, though I am not sure that any herds are bred pure. The Board expresses no opinion on the subject, and does not discuss the kinds of cattle. There are requisites in determining the class of cattle profitable on the farm, which all farmers recognize. The quantity and richness of the milk, quality of beef, cost of keeping, etc. Whatever breed will fill all these purposes, seems to be the kind we want. If the gentleman will make his resolution specific, we can then determine what action should be had.

Mr. Gates reiterated his arguments, but declined to modify his resolution.

Mr. WADDLE. This is an old subject, as it has been before the Board for years. The gentleman complains of the preponderance of Shorthorns. Now, in the premium list of the last Fair, there were two classes. There were thorough-bred (that is the proper term to use,) without reference to Shorthorns as a class. The fact is, the champions of the Longhorns did not like to put them alongside the Shorthorns—the comparison would have been too ridiculous. A few years ago I examined this matter, and I found that for every Hereford exhibited the Board had paid $20; and for every Ayrshire we had paid $20; and for every Shorthorn we had paid $123. Now, I do not see the necessity of having so many classes of cattle. I suppose it is the business of this Board to introduce into the country and promote that interest of agriculture which is the most profitable to the farmers of Ohio; and I suppose that no man in Ohio can make Hereford and Devon cattle profitable in this State.

Mr. GATES. Whoever saw Shorthorn oxen?

Mr. WADDLE. I ask the gentleman to refer to the report of the Board, and he will see that the greatest number of premiums has been given to Shorthorn oxen. At the Cleveland Fair the premium for oxen was taken by Shorthorn oxen.

Mr. GATES. With us we have nothing but Devon oxen—Shorthorns would be a great curiosity.

A vote was then taken on the resolution offered by Mr. Gates, and it was lost.

MEMBERS OF THE STATE BOARD.

Mr. STEVENS. I move that the names of the candidates for members of the Board be announced, that the Secretary may have them printed during recess.

The motion was agreed to, and the following nominations made:

Thomas C. Jones, of Delaware.
W. F. Greer, of Lake.
R. M. Montgomery, of Mahoning.
James Fullington, of Union.
R. R. Donnelly, of Wayne.
John Sears, of Medina.
Isaac Thomas, of Harrison.
Judge Barton, of Belmont.
James Buckingham, of Muskingum.
Nelson J. Turney, of Pickaway.
D. B. Updegraff, of Jefferson.
W. B. McClung, of Miami.
Davis Miles, of Morrow.

Judge JONES. I wish to state to this Board that I am not a candidate for re-election. I would not have been a candidate two years ago, if my wife had not insisted that this was the most respectable body she ever saw me in, and wanted me to continue in the place two years more. [Laughter.]

Mr. McMillan moved that the election be had at seven o'clock in the evening, which was agreed to.

DISTRICT AND COUNTY SOCIETIES.

Mr. W. C. Earle of Lucas, offered the following resolutions:

Resolved, That it be recommended to the farmers and others of this State, in addition to County Societies, to organize in each Congressional District a District Agricultural Society, which shall hold its Fair prior to the date fixed for holding the State Fair.

Resolved, That it be recommended to the County Societies to hold their Fairs prior to the date fixed for holding the District Fairs in their respective Districts, and that in awarding premiums —especially to live stock, or important improvements, a condition of the award be that the subject thereof shall also be required to present the same for exhibition at the District Fair.

Resolved, That it be recommended to the District Societies in making their awards, to adopt a similar condition providing that the subject of the premium shall be exhibited at the State Fair.

On motion of Mr. Earle the resolutions were laid on the table for the consideration of members.

A recess was then taken until two o'clock P. M.

AFTERNOON SESSION.

Upon reassembling in the afternoon, upon motion of Mr. Waddle, the Presidents of Independent Agricultural Societies and all persons interested in agriculture were invited to take seats in the Convention.

Mr. Waddle offered the following resolution:

Resolved, That the reports of Independent District Agricultural Societies be incorporated in the annual reports of the State Board.

Mr. Brown of Greene county, spoke in behalf of a District Society comprising parts of Fayette, Clark, Madison and Greene counties. He said that they had held five Fairs which had proved a perfect success in point of receipts and attendance. They did not ask anything of the State. They had money in the Treasury and plenty of it. They had thought that they ought to have some share in the State Agricultural reports. All they asked was the publication of the proceedings of the Society.

The resolution was adopted.

THE TOBACCO QUESTION.

Mr. Anderson of Butler, offered the following resolution:

Resolved, That to tax Tobacco in the hands of the producer would be inimical of one of the best Agricultural interests in the State, and that this Board should take measures to prevent such legislation by Congress as would materially affect this or any other Agricultural product of the State.

Resolved, That our Representatives in Congress have their attention called to this subject by the Corresponding Secretary forwarding to each a copy of these resolutions.

Mr. Greene. I see, Mr. Chairman, that we have Gen. Louden, of Brown county, with us to-day. As he is largely concerned in the culture of tobacco, I move that he be heard on the subject.

Gen. Loudon responded. I was once in the habit of making speeches, but of late I have done nothing in that line. When I used to attend meetings here, it seemed to me that something was not right in the action of the Board. I supposed the object of the Society to be to benefit all of the agricultural interests of the State; yet they refused to encourage the production of tobacco. We all know that this interest cannot extend over the State, as all kinds of soil are not adapted to its cultivation; but the shale limestone lands of the river counties are adapted to it, and they are bound to be the most productive lands of Ohio—particularly for tobacco and wine. Let me assure the gentlemen who have heretofore sneered at tobacco, that it is in fact the cotton of the North. Cotton is King in the South, and tobacco will be King in this State. It is surprising to see the amount of money tobacco brings into the State. The tobacco-growers of the borders have a greater crop on each acre than can be produced in any other interest. When several years ago I offered to give a pemium on the

acre of ground producing the best tobacco, members of the Board ridiculed it, hitching on in derision "rot-gut-whisky," and yet tobacco in spite of all opposition is growing up in a mighty interest. Shall this course be pursued? Shall tobacco, the finest crop in Southern Ohio, be cast down and trampled under foot? I hope that gentlemen coming up here to protect the agricultural interests of the State, will have an eye to the interests of this portion of the State. Your flat lands of the Central and Northern portions of the State are devoted to general agriculture, but with us we must depend upon specialities. These lands, the hill sides of Brown county, were advertised for sale a few years ago, and nobody would bid over 62½ cents per acre; and now this same land is worth $500 per acre. The Germans have taught us a good deal in this matter. By their skill and industry they have taken these shale hills and made them the best producing lands in Ohio.

Congress is about to tax tobacco in the leaf 20 cents per pound. If Congress does that, it will put an end to the culture in Ohio. If that is done, in order for the producer to get 15 cents per pound, the amount it is worth to-day, he will have to add 20 cents per pound, which will make it cost 35 cents. Then the merchant must have a commission for handling the tobacco, and that promises to bring tobacco in the leaf up to 40 cents, more than it would pay a foreign dealer after exporting it. I have already shown the importance of this interest, and if it is encouraged it will pay the Government a greater tax than corn. Now I ask, gentlemen, that if this is a leading interest of a portion of the State, why not let it take a share in the premiums of the State? The ground is good for nothing else. I believe that every interest should be fostered by this Society; and I will state here, that I believe something should be done for the wine interest—that a premium ought to be offered for the best manufactured grape wine. In conclusion, as touching the remark I have made, I offer the following resolutions:

[Objections being made, the resolutions were read as part of the remarks of Gen. Loudon.]

Resolved, That the Agricultural Board be requested to offer the following premiums on Tobacco raised in the State of Ohio: $10 for five hands each, Mason County Seed Leaf and of the best manufacturing kind; $5 for second class; $50 for the best hogshead of each of the first class; $25 for the best hogshead of the second. Each hogshead to be inspected at one of the warehouses in Cincinnati; the tobacco to be of the crop of previous year on which premium is paid.

Resolved, That a premium of $20 shall be offered for the best three samples of pure Ohio wine, made from the Catawba, Virginia Seedling or Delaware grape, and $10 for the second best. The wine to be of the vintage of the year previous to the fair, and taken from casks of at least 20 gallons.

Mr. Loudon continued his remarks, which covered the same grounds as in

the first part of his speech. He said that when the Congressional Committee first proposed a tax on leaf tobacco, the Baltimore dealers protested, and they abandoned the attempt at once. Now the resolution offered by Mr. Anderson is simply to bring the matter before Congress through the Secretary of your meeting. It had been asserted that Ohio could never compete with Kentucky in raising tobacco, but it is found that we can and do beat them all the time. And you will find that the best tobacco sold in the Cincinnati market at 40 cents per pound, as Mason county, Ky., tobacco, was really raised in Brown county, Ohio. It is discreditable to this Society under all these circumstances, to put down their foot upon an interest so prolific of wealth.

Mr. WADDLE. It seems to me that my friend from Brown has proven too much, that if it is more profitable to raise tobacco than other productions, then it can bear taxation.

Mr. SMITH of Clermont. I do not think that Gen. Loudon has proved quite as much as he might have proved on this subject. If he had gone further he would have found that there is a tax now of 15 or 20 cents per pound on manufactured tobacco. We do not want to put a tax upon leaf tobacco because we want to ship it to pay some of our outside debts. If you do put a tax of 20 cents upon it, then the price is increased so that we cannot export it.

Hon. COLUMBUS DELANO of Knox. I do not propose to discuss the questions raised by the gentleman, but it seems to me that this Board ought to consider a little this question: How far they ought to interest themselves in these various methods belonging to the agriculture of the State so far as to influence Congress in perfecting legislation. This Board has a specific duty to perform, that is the protection and encouragement of the agricultural interests of the State. Now, if we undertake to make ourselves the particular advocates of any particular interest of the State, conflicts will ensue and interrupt the harmony and destroy the usefulness of the Board. My opinion is that we had better not interfere with such subjects as contemplated in the resolution. Without considering whether there ought or ought not to be a tax on leaf tobacco, I shall vote against the resolution.

Mr. GATES. I concur with Mr. Delano. The government must raise revenue to carry on this war, and therefore it is not for us to interfere with Congress in this matter. The question is outside of the business of this Convention, and I shall move that the resolution be indefinitely postponed.

Mr. GREENE. I had supposed that the object in creating this State Board of Agriculture was for the purpose of protecting and fostering agriculture, but it may have been for the purpose of protecting special inter-

ests, such as Shorthorns, for instance. I am not in favor of using tobacco—never have used it myself and despise it—but I am astonished at coming up here year after year to find gentlemen opposing the encouragement of this interest—to find that they ignore it. I hope this question will be put squarely, and that the motion to indefinitely postpone will not prevail.

Mr. GARDNER. A neighbor of mine has taken an active part in this movement. He is interested in raising tobacco, and has called my attention to the subject. It is a growing interest in the State. We have also manufacturers who are making large fortunes by the consumption of tobacco. Now, then, the government is in straightened circumstances, and in order to keep up the war it is necessary to tax luxuries. I do not know that this act will pass through Congress, but whether it does or not, it seems to me that this body should exercise a proper degree of delicacy in speaking on this subject. I am not opposed to the culture of tobacco and the encouragement of its production, but to interference in legislation. It seems to me that a body occupying the position of this body to dictate to Congress is a step it ought not to take. We have always acted with a determination to make as few recommendations as possible. It is certainly proper that production should bear its share of the burdens laid upon us all. Individual members of the Board may, with propriety, express their opinions to, and use their influence with, their Representatives in Congress, but we should be transcending our sphere in recommending the modification of any tax necessary to the support of governments in time of war. And another thing may be taken into consideration in discussing this question: Luxuries do not need encouragement, as the appetites of men furnish them sufficient encouragement.

Mr. SMITH. It seems to me that gentlemen do not understand this question. They talk as though we do not want a tax put upon tobacco. Now this is the point we urge. European manufacturers send agents to this country to buy tobacco where they can buy cheapest. Now, if you put a tax of twenty cents per pound upon your tobacco, the market price will be so increased that they will not come here, and our export trade will be cut off. We are in favor of a high tax upon tobacco, so adjusted that it will not be upon the leaf; and we are in favor of sustaining the Government in every respect, even to the extent of putting a tax upon land.

Judge JONES. To which Government did the gentleman have reference in his remarks?

Mr. SMITH. To the French Government, which has had employed a large number of agents to purchase tobacco in this country.

Judge JONES. The English Government, on the other hand, has im-

posed an import duty of 3s. 6d. (87½ cents,) per pound, so as to discourage its being brought there.

The resolution was then put to vote, and lost.

DISTRICT SOCIETIES.

On motion of Mr. Earle, his resolution in reference to the organization of District Societies, was taken from the table.

Mr. Earle. It may have been a little unseemly in one who has just made his first appearance in this Society, to bring forward a subject of so much magnitude. I do not know what the experience in all parts of the State may be, but I do know that there is a want of interest amongst the farming population of our county in agricultural matters. They do not take hold of our county organization as we desire they should, and the question is whether by the adoption of such a resolution, authorizing the organization of a society in each Congressional District, which shall have a tendency to excite competition, such as a mere exhibition in a county cannot, they will not be induced to interest themselves as they ought? Again, the consideration is, whether, when we have articles worthy of being exhibited, especially in the way of live stock, it is not well to take some means by which that stock shall be represented in a larger field? One of the conditions of the awards should be that the successful competitor in a county society shall take that animal to the district society, and the successful party there take the successful animal to the State Fair. Now, if this rule be adopted as to the county and the district societies, and they all send up their representatives from the lower to the higher organization, instead of the difficulties represented by my friend in reference to the vacancy of stalls at Cleveland, existing, we shall have the various counties represented by the finest animals claimed to be raised there. The time may come when it will require all the influence of the Board to keep up the Fairs, and when such a system may be adopted. If gentlemen fail to give this their endorsement to-day, I ask them to carry it home with them, discuss it with their neighbors, and see what their judgments will be in the future.

The resolution was lost.

TOBACCO QUESTION.

Mr. Greene. I offer for adoption the following resolution, which I submit without debate:

Resolved, That the State Board be instructed to offer suitable premiums on Tobacco in the hands of the producer.

The resolution was adopted.

LOCATION OF STATE FAIR.

Mr. STEVENS. For the purpose of testing the question, I offer the following resolution:

Resolved, That all subsequent State Fairs be held at the city of Columbus.

Mr. ANDERSON. Would an amendment be in order? If so, I submit the following:

Adding the following proviso: *Provided*, Columbus will pay a larger bonus than any other city of the State.

Mr. GATES. If Columbus will give more than any other city for the next two years, the Fair may, with propriety, be held there. But I would not locate the State Fair permanently in any Copperhead county. [Applause.] In other words, in any county of a district while they have such a representative in Congress as Sunset Cox. [Renewed applause.] That's all I have to say on the subject at present.

Mr. GREENE. I think it is useless for this body to attempt to locate the State Fair permanently; if you do attempt it, you must first have a permanent State Board. We are here to-day, but somebody else may be here to-morrow, and undo the work done by the preceding Board. A vote was then taken on the amendment. Carried. The resolution as amended was lost.

ASHLAND COUNTY.

Mr. Jones asked if the Committee in the case of Ashland county was ready to report?

Mr. McClung (one of the committee,) stated that Mr. Welch, of the committee, had gone home, and that it would be necessary to fill the vacancy.

Mr. Greene said the evidence was documentative, and so voluminous that it would be almost impossible to go through with it by the time the Convention would adjourn. He therefore moved to refer the whole matter to the State Board.

Mr. McClung hoped it would take that direction.

Mr. Gardner objected. It was for this Society to determine who are its members, and not the State Board.

Mr. Greene withdrew his motion, and the Chair appointed Mr. Harr, of Champaign county, to fill the vacancy in the committee.

ELECTIONS BY COUNTY SOCIETIES.

Mr. Shadrack Dial of Clermont, offered the following resolution:

Resolved, That County Societies be permitted to elect their officers on the last day of the Fair, instead of January. Officers elected to enter upon their official duties after the annual meeting of the State Board in January.

Mr. Stevens. I would like to ask gentlemen advised on that subject, if there is any statute requiring the election to come off on that day? I do not know that there is any law prohibiting societies regulating that matter for themselves.

Mr. McMillan proposed an amendment that the elections be held in November.

The President. In answer to the question as to whether there is a fixed day for such elections, I would state that there was a law passed requiring the Board to make regulations for the government of County Societies. The Board, for some good reason, fixed the day of election for these societies. It is necessary for societies to furnish evidence that they have a legal existence, and a formally elected Board of officers is essential as this evidence. The election must take place in January.

Mr. McMillan read the rule.

Mr. Gardner. It is true that this amounts to legislation. It is the duty of the Board to establish regulations for the societies, though the question has not been asked delegates as to the time of their election. Some come up here representing last year's duties, and all representing properly accredited societies. The question is whether the societies shall be composed of old officers or new officers—whether they come up to close up the old business, or to lay out new business. It seems to me that the members of Boards should be old officers to close up business, after which their successors should be elected. During the time of holding the Fairs, promiscuous assemblages are in attendance, and officers elected then cannot be so substantially the representatives of the interests of agriculture as if elected in January. This is a practical question. It is whether the old or the new officer is the proper representative in this Convention. Practically, the fact is that societies have elected their officers whenever it suited their pleasure. Some have been elected the first day of the Fair, others when they settled the premiums, and others as provided by the rule of the State Board on the first of January, so that the regulations have been inoperative, and that is the reason they should be reviewed.

Mr. Stevens proposed an amendment so as to authorize the election of officers on the last day of the Fair, instead of in January, as now required.

Judge Jones. I would add in addition to the remarks of Mr. Gardner, that the law requires that the members who vote at these elections shall be members of the society, and by the practice of most societies that is determined by the number of family tickets sold during the Fair—the Treasurer keeping a list of persons buying tickets amounting to a dollar. Now, if the day for holding such elections was fixed on the day for holding the Fair, it would be difficult to determine who are entitled to vote. If

fixed for the last day of the Fair, everybody would be running here and there, too busy to give thought or attention to the matter.

Mr. DONNELLY of Wayne. I am in favor of the societies adhering to the regulations of the State Board. In our own county we have elected in January, as provided by the Board, and have suffered no inconvenience. I am opposed to giving these societies the license to take their own time in this matter.

Mr. STEVENS. At first I was inclined to oppose the resolution, but there are good arguments in its favor. I do not know that we should tie up our hands in this matter, as what is done now may be undone hereafter. There is an objection raised in our locality to having the election held in January, as was formerly done, and it is this: January is a season of the year when it is difficult for the farmers (and they are most interested in the Fairs,) to get out, while the majority in attendance are people from the town, who, our people claim, go in there to control the offices. Therefore they have not a fair chance in these elections, and on this account I would favor an election on the last day of the Fair.

Mr. DONNELLY. In our county farmers do not lose anything by having the election controlled by citizens of villages.

Mr. MCCLUNG. I am in favor of adhering to the rule laid down by the Board. I think that if, as the gentleman says, in his county farmers are not interested enough in agriculture to go to the election, then the work ought to be done by the people of the town. The only way to carry this thing on, is for men to take hold of it and spend their time in earnest in the matter. In our county we have always complied with the rule of the State Board. We had some experience in the last day's business, and found that the election was managed by persons interested in the success of certain friends. That was speedily corrected. The kind of men who will build up a society are those who will go through hot and cold to attend to the business. I should like to see another resolution introduced here asking the General Assembly to repeal the law requiring us to meet upon the assembling of the Legislature. We should create interest enough in agriculture to come out at any season of the year independent of the Legislature. We ought to meet in session for at least four days, and send men up as representatives who take an interest in this matter, and when we do this agriculture will loom up.

Mr. KELLOGG of Ashtabula. No gentleman in my hearing has suggested any good reason why we should not hold these elections on the last day of the fair, or any other time the members of the society may choose. Is there any reason why the people of Ashtabula county should be compelled to meet on any specific day? Has there been any other reason assigned for

holding the election on the first of January, than because it is a rule adopted by the State Board? In Ashtabula county we have held our elections on the last day of the fair, and have experienced no inconvenience from it. Now, Mr. Chairman, it seems to me in the spirit of our institutions to leave the election to the choice of the citizens interested, and the talk about compelling the people to be more strict in this matter, is in direct opposition to it. There can be nothing neglected by doing so, for farmers do look to their interests. It is not the gentlemen who come up here to make speeches who are the life and soul of these fairs, but those who produce the articles upon their farms contributed to them.

Mr. GATES. With us we find that the new system works better than the old. On fair days we have enough to attend to in getting our stock into place and caring for it, while we have found that on the last day of the Fair some intrigue was sure to be gotten up in favor of some packed ticket. But under the new system we come together in January, take the time to talk matters over, and elect our officers; and we find it profitable. It is a good plan, and I hope it will be adhered to.

Mr. STEVENS replied, defending his former position. He said that he found that there was a good deal of feeling between the country people and the town people. He wished to overcome that prejudice, if possible. He did not think there was anything improper in granting this privilege to Societies to elect their officers at their own pleasure.

Mr. WADDLE. I was a member of this Board when this rule was adopted. There were petitions from several counties for the Board to take action to prevent the election during the progress of the Fair, as they were oversloughed by interested parties.

Mr. HARR of Champaign. In our county we elect our officers immediately after the meeting of the State Board. The payment of one dollar entitles to membership.

The PRESIDENT. I will read for the information of members, and as an excellent way for managing these matters, the published notice for an election in Butler county. But I will just say, in addition to what Mr. Waddle has said, (for I was also a member of the Board at that time,) that such regulations were considered necessary. The rules that we have on the last page of our reports, were written by Major Milikin. The Board had had before it ever so many cases where there were two or three claiming to represent their respective counties. The elections were held on different days, and each claimed his election to be perfectly valid. It was desirable to have one time fixed when the election should be considered legal, and all cause for contention removed. The president then read the following call for an election in Butler county:

Election Notice.—There will be an election for Butler county Agricultural Officers on Saturday, Jan. 9th, 1864. Polls open at the Court House at 1 o'clock P. M., and close at 3½ o'clock. All residents of the county holding a family card, with their names inscribed thereon, are entitled to vote, and none others.—Hamilton, Dec 26, 1863.

Messrs. Anderson and Donnelly both expressed themselves in favor of adhering to the regulations of the Board.

On motion of Mr. Green, the resolution was indefinitely postponed.

QUESTIONS ABOUT PLOWING.

Judge Jones offered for the consideration of members the following queries:

1. **Has sub-soil plowing been found beneficial; and if so, upon what kind of soil have the greatest benefits resulted?**

2. **Has plowing with the Michigan Double Plow been found beneficial; and if so, upon what kind of soil have the greatest benefits resulted?**

These questions were accompanied with some remarks by Judge Jones, which were not distinctly audible to the reporter. The substance of what he distinguished is here given:—It is believed now that it is no advantage to the land or crop to turn the soil clear over in any case. The object in deep plowing is to loosen the soil and air it. In regard to double-shovel plowing, where the clay soil is thrown on top, and the surface soil clear to the bottom of the furrow, my observation is that it is no benefit, but rather injurious. And I have not observed any greater benefit from sub-soiling; but I have found the most beneficial results from just turning over the ground so that it would lie as one tile upon another. My experience is that sub-soil plowing on clay soil is not beneficial; that is, that it does not bring up the clay and make it light and beneficial to the grain. A plow has been invented in Scotland by the Marquis of Tweeddale, by which the combined benefits of deep plowing and draining may be secured. The mold-board is convex, and the soil is thrown immediately away and the furrow left loose. It is claimed for this plow, that with one span of horses you can plow to the depth of twelve inches; and it is also claimed, that what it is desired to accomplish by plowing is better done in that way than in any other mode yet discovered. What I said in regard to plowing with the Michigan Double Plow I will state more plainly: It was that you put the surface soil in the bottom of the furrow beyond the action of the sun and air, and the clay on the top, which makes a hard surface. And now let us occupy the few moments left in hearing the experience of gentlemen on this question.

Mr. W. H. Witter of Medina. I find that sub soiling does not answer

the same purpose in all kinds of soil. For instance, a stiff clay soil needs to be sub-soiled deeper and finer than one with more gravel. Mr. Whitter then gave illustrations from his own experience, showing this to be the case. He had a piece which had been in pasture nine years, gravel, which he sub-soiled—the sod being turned under; planted corn, and gathered something over a medium crop. Another piece he plowed to the depth of seven inches; followed with another team and sub-soiled; had a heavy crop. A third piece of clay sub-soil, rolling land, tried sub-soiling and got about ten bushels to the acre,

Mr. GILES BOALT of Huron, had used the Michigan Double Plow, and derived so great a benefit from it, that he resolved to use the sub-soil. The crop was more easily tended, and the ground in better condition for putting in the corn.

Mr. ANDERSON of Lake. My experience in sub-soiling lands is, that it will do some good in retaining moisture longer and protecting the ground from drouth. The Michigan Double Plow does not require more than two horses, and it has added to and actually made soil upon land that had been exhausted by imperfect cultivation. When I was a boy, a Dutch farmer came from Pennsylvania into our neighborhood and purchased an old, worn out farm. The land had been cultivated for many years after the shallow-plowing method, and was supposed to be of little account; but the new proprietor put on three horses when he came to plow it, and the result was, that where only from six to eight bushels per acre had been raised, he soon produced *eighteen* bushels. He used a large plow—old fashioned—and plowed from eight to ten inches deep. Then if we produce the same beneficial results with a heavy plow that we do with a double plow, we shall save expense. My experience is that this kind of plowing depends a good deal upon the season. Deep plowing is sure to stand drouth better than shallow. A stubble plow is not a good plow for sod land. In plowing stubble with a duoble plow you put the stubble out of sight. So I consider double plowing is better than single plowing with a harrow. The farmers of Lake county hold annually a plowing match, which keeps our plow-makers posted, and unless they make good plows for the market, we go beyond them. I think every Society should hold a plowing match on the first day of the Fair. The speaker then went on to show how their plowing matches were conducted, and how advantageous it was to their people.

Mr. WHITTER. This field I spoke of, contained some eight acres. I was holding the sub soil plow myself, and just at night a gentleman came and called me away, and one land was left without being sub soiled. I was afterwards glad of this occurrence, for it gave me an opportunity of testing

the advantages of sub-soiling. You could very rerdily see the difference in the wheat in the field. The single land that was not sub-soiled did not yield over seven or eight bushels to the acre.

Judge JONES. That is the way to do: when we get a new instrument we should experiment. Now, the experiment mentioned does not get at what I wanted at all. Plowing at unequal depths with different kinds of plows is no test. Plow with a Michigan Double Plow and a single plow to the same depth, and such an experiment would show which was the best. And so make the test with a sub-soil plow. The Scotland plow I mentioned before plows to the depth of twelve inches. Now, I would like to know —and it is the information I wish to result from this discussion—whether the same depth of plowing with a single plow is not better than plowing deep with a Michigan Double or a sub-soil plow. The experience in England is against sub-soiling.

Mr. RENICK of Franklin. The method of turning the clay to the top, mentioned by Mr. Jones, would not produce peas. Sub-soiling is beneficial, but in deep plowing you turn clay up. Sub-soiling loosens the ground and admits the air. But, after all, success depends upon the kind of soil.

Mr. WHITTER referred to a further and interesting experiment of his, and gave it as his opinion that there are valuable producing qualities in clay sub-soil. He desired to make a pond on a piece of low swampy ground. The pond was scraped out to a depth of three or four feet, and in order to test the strength of the sub-soil, he sowed wheat upon it, hard and lumpy as it was, and the result was that it produced fair grain.

Upon motion of Mr. Waddle the Convention took a recess until seven o'clock P. M.

EVENING SESSION.

ELECTION OF MEMBERS.

The Convention re-assembled at seven o'clock in the evening and proceeded to an election of members of the Board.

The Secretary announced that the name of James Buckingham was withdrawn from the list of candidates.

The result of the first ballot was as follows:

Thomas C. Jones of Delaware, 46; Wm. F. Greer of Lake, 20; Robt. M. Montgomery of Mahoning, 13; James Fullington of Union, 38; R. R. Donnelly of Wayne, 12; John Sears of Medina, 13; Isaac Thomas of Harrison, 7; Judge Barton of Belmont, 3; Nelson J. Turner of Pickaway, 38; Wm. B. McClung of Miami, 39; D. Miles of Morrow, 1; D. B. Updegraff of Jefferson, 16; James Buckingham of Muskingum, 7. Whole number of votes cast, 51.

Messrs. JONES, FULLINGTON, TURNEY and McCLUNG having received a majority of the votes cast, were declared duly elected.

The names of Messrs. Donnelly, Thomas and Barton were withdrawn.

Upon a second ballot being taken the following votes were cast:

Wm. F. Greer, 31; R. M. Montgomery, 8: John Sears, 5; Isaac Thomas, 2; D. B. Updegraff, 4.

Mr. GREER was declared elected.

ASHLAND COUNTY QUESTION.

Mr. McCLUNG, from the committee on the Ashland county case, made the following report, which was unanimously adopted:

The committee to whom was referred the contested seats of delegates from Ashland county, find, upon examination, that the whole matter of this contest was referred to the State Board of Agriculture, and that the State Board of Agriculture, by resolution, declare that neither society is entitled to recognition under the law, as regularly constituted, and that they further declare, by resolution, that they advise the contestants to meet at the Court House in Ashland on the 6th day of June, 1863, between the hours of 1 and 4 P. M., and organize a new society for said county, (page 132 of Records of State Board of Ag. Soc.) Your committee find that the Society represented by W. B. McCarty, has complied with the above action of the State Board of Agriculture; in view thereof your committee recommend that W. B. McCarty be admitted as the delegate for Ashland county.

W. B. McCLUNG,
N. H. HARR,
J. M. KAUFMAN.

The hour having arrived when the Senate Chamber was to be occupied for the delivery of an address by Hon. Henry S. Randall, the Convention formally adjourned.

OHIO STATE FAIR FOR 1863.

The Fourteenth Ohio State Fair was held in the city of Cleveland, on Tuesday, Wednesday, Thursday, and Friday, the 15th, 16th, 17th, and 18th days of September, 1863.

At the urgent solicitation of many members of the Annual Convention in 1861, the Fair was held two successive years in Dayton; and in accordance with a generally expressed desire to test the successfulness of holding the Fair two successive years on the same grounds, the Fair for 1863 was located at Cleveland.

The Thirteenth and Fourteenth Annual State Fairs were held in the city of Cleveland, notwithstanding the fears of many, were successful. Unlike other State Fairs, they were held at a time when our country was bleeding at every pore—when scarce a neighborhood or a hamlet in the State but mourned sons or brothers, a sacrifice to the fierce and sanguinary war now waging, without cause, by armed traitors against the best government ever devised by human hands. They were appointed at a time when many of the best and bravest of Ohio's sons were in the field—when her army, now in arms to defend the Union from destruction, in rank and file was greater than the army of the Revolution had at any time under arms, greater than at any one time in the field during the war of 1812, and twice greater than the army that fought its way from Vera Cruz to the City of Mexico, and planted the banner of the Republic on the capitol of that nation, which France, with her mighty power, has since failed to subdue. At such a time as this—the Union in danger herself, consequent upon a state of war, crippled—financial matters deranged—the State Fairs were held in Cleveland, and each one was a *success*, while all predicted it would be a failure, and many begged that it might not be held. Cleveland may well boast of the fact; the Western Reserve may well congratulate herself that they were not a failure, for her sons did nobly in sustaining them, and Ohio, brave, gallant, and patriotic Ohio, has shown that although she has sent her sons to battle in numbers greater than any army ever before raised on the continent, still protects and fosters the arts of peace, even in the midst of peril to the nation and amid the desolating scenes of civil war.

Have we not, then, cause to congratulate ourselves and the people of Ohio upon the example thus shown to sister States? Have not the citizens of Northern Ohio cause to be proud of that success, achieved amid the difficulties which beset us? Truth must answer all these questions in the affirmative.

That success proves another thing, and that too of the greatest moment, and which must have its effect. It shows that our people, even amid the horrors of war, and the prediction of men that the Union is rent, never again to be reunited, the "wish being father to the thought," are still buoyant with hope, for without that hope the Fair must have signally failed.

The world's history shows that nations have never degenerated, have never been enslaved, while holding labor as reputable. It was only after riches and luxury had begot pride and extravagance that Rome, once the mistress of the world, began her decline, and fell. Later she became disreputable, mechanic and agricultural pursuits were held as derogatory to man, and were to be performed only by menials, and the term Roman citizen soon ceased to be a boast, for Rome forgot her industry, ceased its protection, and went the way of the idle and the depraved. The heart of the American people still clusters around the labor of the country; her farmers, artists, mechanics, are still her pride, her boast, her bulwark, and we trust ever will be. At such a time as this, in the darkest hour of our nation's travail, Ohio sent up her finest stock, her finest fabrics and articles of industry, and her most enterprising men, to the great State exhibition, and aided in making it the great success it was. Thus may it ever be; no matter what the state of the country, let Ohio point to her industrial crops as did the mother of the Gracchi to her sons, and cherish them as her jewels, and, in doing so, foster her State exhibition as academies of design and schools of industry, where in competitions the people of the State come together and in a noble strife compete for the greatest excellence of useful arts.

The following is a list of entries and awards at the Fair:

ENTRIES OF THOROUGHBRED CATTLE.

1. H. A. Millikin, Windham, Portage county, bull, President, jr., 1 year old.
2. D. B. Bacon, Wakeman, Huron county, bull, Ben Butler, 16 months.
3. John M. Glover, West Liberty, Logan county, cow, Snow-drop, (Roan) 5 years.
4. do do do do Lewella White, 4 years.
5. do do do bull, The Marquis II., white, 5 years.
6. do do do calf, Flora, white, 5 months.
7. J. Emerson Smith, do do bull, Young Exception, (light roan) 5 yrs

8. C. P. Irwin, Fairfield, Huron county, bull, Bernard, 7 years.
9. do do do do Robert, 3 years.
10. do do do do Colonel, 1 year.
11. R. Baker, Avon, Lorain county, bull, New Years Day, 8 months; red and white.
12. Wm. Hurst, do do do Capt. Clay, 2 years; red and white.
13. J. Pifiers, Burton, Geauga county, bull, Red Jacket, 2 years.
14. do do do do Sigel, 1 year.
15. do do do cow, Jenny Brown, 5 years.
16. do do do heifer calf, Stella, 5 months.
17. D. McMillan, jr., Xenia, O., bull, Buckeye, 8 years.
18. do do do General Grant, 1 year.
19. do do do calf Miami Duke, 15 months.
20 do do cow, Elsie, 4 years.
21. do do do Miss Ophelia, 3 years.
22. do do heifer, Duchess of Oakland, 2 years.
23. do do do do do II., 2 years.
24. do do do Florence, 1 year.
25. do do do Lady Fairy, VIII., 1 year.
26. do do do calf Carrie Watson, 9 months.
27. do do do do Alfaretta, 6 months.
28. Wm. Palmer & Son, Bloomfield, O., bull, Fayette, 4½ years.
29. do do do calf, 4½ months.
30. do do cow, Prarie Flower, 5 years.
31. do do do Linda Bell, 4 years.
32. do do do Red Em, 4 years.
33. do do do Lady Blanche, 2 years.
34. do do do Princess, 1 year.
35. George M. Coulter, Reesville, O., cow, Nannie Rhodes, 2 years.
36. do do do Elizabeth IV., 2 years.
37. do do do Eglantine III., 7 years.
38. do do do Strawberry II., 2 years.
39. do do do Eglantine II., 7 years.
40. do do bull, Buckeye, 1 year.
41. do do do Challenger, 6 years.
42. do do do Young Count Fathom, 2 years.
43. Jacob Powell, Reynoldsburg, bull, Washington's Day, 3 years.
44. E. Driggs, Elyria, O., cow, Amanda, 9 years.
45. do do do Snow Ball, 5 years.
46. do do bull, May Duke, 5 years.
47. do do cow, Lady Jane Gray, 4 years.
48. do do do Bella Scott, 4 years.
49. do do heifer, Matchless, 3 years.
50. do do cow, Susie Bell, 5 years.
51. do do do Pride of the Valley, 9 years.
52. do do do Grade Cow, 6 years.
53. C. M. Clark, Springfield, O., bull, Duke of Clark, 22 months.
54. do do do calf, 2 weeks.
55. do do cow, Flora Bell, 5 years.
56. do do do Anna Hunt, 4 years.
57. do do do Easter Day, 10 years.
58. do do heifer calf, Fanny, 13 months.
59. do do do Dora II., 5 months.

60. C. M. Clark, Springfield, O., heifer calf, Lady of Clark, 7 months.
61. P. O. Maley, Cleveland, bull, Jack, 4 months.
62. C. Richmond, Euclid, bull, Bakewell, 5 months.

LIST OF AWARDS ON THOROUGHBRED CATTLE.

Best bull, 3 years old and over, "Fayette," Wm. Palmer & Son, Bloomington, Fayette Co.	$50
2d best do, "Washington Day," Jacob Powell, Reynoldsburgh	30
Best bull, 2 years old and under 3, Wm. Hurst, Avon, O.	30
2d best do, G. M. Coulter, Reesville	20
Best bull, 1 year old and under 2, C. M. Clark, Springfield	25
2d best do, D. McMillan, Xenia	15
Best bull calf, Wm. Palmer & Son, Bloomington	10
2d best do, D. McMillan, Xenia	5
Best cow, 2 years old and upward, C. M. Clark, Springfield	50
2d best do do do do do	30
Best cow, 2 years old and under 3, D. McMillan, Xenia	30
2d best do, Wm. Palmer & Son, Bloomington	20
Best heifer, 1 year old and under 2, D. McMillan, Xenia	25
2d best do do do do do	15
Best heifer calf, C. M. Clark, Springfield	10
2d best do, D. McMillan, Xenia	5

AWARDING COMMITTEE—A. Waddle, R. W. Musgrave, C. Wallace, A. L. Perrill.

ENTRIES OF WORK-OXEN AND STEERS.

1. H. S. Johnson, Windham Station, O., pair of working steers, 2 years old.
2. F. G. Pritchard, Brunswick, Medina county, pair of steers (oxen), 3 years old.
3. do do do steer, 3 years old.
4. do do do steer, 3 years old.
5. do do do 3 steers at one birth, 3 years old.
6. Wm. Nelson, Farr, Medina county, 1 pair of oxen, 4 years old.
7. J. L. Kelsey, Leavenworth, Kansas, 1 pair of buffaloes, 2 years old.
8. do do 1 do 2 years old.
9. G. S. King, Madison, Lake county, 1 pair of oxen, 2 years old.
10. L. G. Byington, Elyria, O., 1 pair of oxen, 3 years old.
11. do do 1 pair of steers, 3 years old.
12. do do 1 pair of steers, 5 years old.
13. do do 1 yoke oxen, 5 years old.
14. E. Driggs, do 1 steer, Jack, 5 years old.
15. do do 1 steer, Constitution, 3 years old.
16. do do yoke oxen, 7 years old.
17. Luke Dornell & Co., Royalton, O., yoke oxen, 4 years old.
18. do do yoke steers, 3 years old.

PREMIUMS AWARDED ON WORK-OXEN AND STEERS.

Best yoke of oxen, 4 years old and upwards, Wm. N. Farr, Medina	$25
2d best do, Dornell & Co., Royalton, O.	15

ENTRIES OF FAT CATTLE AND MILCH COWS.

1. James Langhorn, Cleveland, O., steer, 4 years old.
2. do do heifer, 5 years old.
3. R. Baker, Avon, Lorain county, cow, Victoria, 9 years old.
4. do do do cow, Empress, 9 years old.
5. M. Pellett, Cleveland, O., milch cow, Schook, black and white, 5 years old.
6. J. J. Coulter, Reesville, O., fat steer, Bright, 7 years old.
7. do do fat steer, Pugh, 5 years old.
8. Mrs. Foote, Cleveland, O., milch cow.
9. E. Driggs, Elyria, O., 1 fat cow, 6 years old.
10. do do 1 fat cow, 6 years old.

PREMIUMS AWARDED ON FAT CATTLE AND MILCH COWS.

Best single bullock, 4 years old and upwards, J. G. Coulter, Reesville	$30
2d best do, J. Langhorn, Cleveland	20
Best steer, 3 years old and under 4, L. G. Byington, Elyria	20
2d best do, E. Driggs, Elyria	10
Best cow or heifer, E. Driggs, Elyria	20
Best milch cow of any breed, R. Baker, Avon, O.	30
2d best do do do do	20

H. C. Harris, Chairman of Awarding Committee.

STATEMENTS OF EXHIBITERS.

REESVILLE, Clinton county, Sept. 14, 1863.

These cattle (Bright and Pugh) were fed once a day on shock corn during the winter, and since then ran on grass.

J. G. COULTER.

AVON, Lorain county, Ohio, Sept. 8th, 1863.

"Victoria," roan, a milch cow, entered and owned by R. Baker, Avon, Lorain county, Ohio, was calved in May, 1854, being nine years old; was got by Corsair, out of a half Durham cow. Victoria calved last on April 6th, 1863. She was put to bull again July 1st.

She gave in ten days, commencing June 4th, 485 lbs. of milk, from which was made 21 lbs. 6 oz. of butter. She also gave in ten days, commencing August 9th, 351½ lbs. of milk, from which 18 lbs. 1 oz. of butter was made.

The cow fed on grass only from 1st of May last to present date.

During first trial, she was on old pasture. Four days previous to second trial, she was put into good clover meadow, which had been mowed. The weight of cow 1,180 lbs.

R. BAKER.

This is to certify, that I milked the cow Victoria; helped to weigh the milk; assisted in making the butter, and weighed the same; and believe the above statements are correct.

FRED. R. BAKER.

Personally came before me, a Justice of the Peace for Lorain county, R. Baker and Fred. R. Baker, and made oath that the above statements are correct.

PHILIP SAWYER, Justice of the Peace.

AVON, Lorain county, Ohio, Sept. 8th, 1863.

"Empress," light roan, calved in June, 1854. Entered and owned by R. Baker, Avon, Lo-

rain county, Ohio. Was got by Corsair, out of a three-quarters Durham cow. Empress calved last, May 11th, 1863. She was put to bull again June 24th.

She gave in ten days, commencing June 10th, 1863, 416 lbs. of milk, from which 20 lbs. 6 oz. of butter was made. She also gave in ten days, commencing August 14th, 311 lbs. of milk, from which was made 16 lbs. 8 oz. of butter. The cow fed on grass only since 1st of May.

During first trial, she was on old pasture land. Four days previous, and during second trial, she was put on good clover meadow, which had been mowed. The weight of cow 1,000 lbs.

R. BAKER.

This is to certify, that I milked the cow Empress; helped to weigh the milk; assisted to make the butter, and weighed the same; and believe the above statements are correct.

FRED. R. BAKER.

Personally came before me, a Justice of the Peace for Lorain county, R. Baker and Fred. R. Baker, and made oath that the above statements are correct.

PHILIP SAWYER, Justice of the Peace.

ENTRIES IN SWEEPSTAKES—CATTLE.

1. D. E. Bacon, Wakeman, Huron county, bull, Ben Buttler, 16 months.
2. C. P. Irwin, North Fairfield, do do Bernard, 7 years.
3. do do do do Robert, 3 years.
4. do do do do Colenel, 1 year.
5. G. McMillan, jr., Xenia, O., bull, Buckeye.
6. do do do Gen. Grant.
7. do do cow, Elsie.
8. do do do Jessie.
9. do do do Duchess of Oakland.
10. Wm. Palmer & Son, Bloomington, O., bull, Fayette.
11. do do cow, Prairie Flower.
12. do do do Linda Bell.
13. do do do Red Em.
14. do do herd, bull, Fayette; cows, Prairie Flower, Linda Bell, Red Em and Lady Blanche.
15. George M. Coulter, Reesville, O., bull, Challenger.
16. do do do Count Fathom.
17. do do cow, Eglantine II.

18 and 19. do do herd, bull and five calves, bull, Challenger; cows, Nannie Rhodes, Eglantine III., Elizabeth IV., Strawberry II. and Buckeye.

20. Geo. M. Coulter, Reesville, O., herd, bull, Challenger; cows, Nannie Rhodes, Elizabeth IV., Englantine III. and Englantine II.
21. Samuel Toms, Elyria, O., bull, Chippeway, 6 years old.
22. D. McMillan, jr., Xenia, O., herd, bull, General Grant; cows, Jessie, Elsie, Miss Ophelia and Duchess of Oakland.
23. Jacob Powell, Reynoldsburgh, O., bull, Washington's Day.
24. J. Ward, Cleveland, O., cow, Fairy, 3 years old.
25. C. M. Clark, Springfield, O., bull, New Year's Day.
26. do do do Gladiator.
27. do do do Duke of Clark.
28. do do herd, bull, Gladiator; cows, Flora Bell, Easter Day, Dove and Anna Hunt.

29. C. M. Clark, Springfield, O., cow, Flora Bell.
30. do do do Anna Hunt.
31. do do do Easter Day.
32. E. Driggs, Elyria, O., herd, bull, May Duke; cows, Matchless, Snow Ball, Amanda and Pride of the Valley.
33. William Hurst, Avon, O., bull, Capt. Clay.

PREMIUMS AWARDED ON SWEEPSTAKES.

Best herd of one Bull and four Cows, all to be bred and owned by exhibiter, D. McMillan, Xenia	$100
2d best, C. M. Clark, Springfield	50
Best Breeding Bull, to be exhibited with five of his calves, not less than 1 year old, and the bull as to constitution, health and vigor, to exhibit good breeding condition, G. M. Coulter, Reesville	50
Best Bull, of any age or class, D. McMillan, Xenia	50
Best Cow, of any age or class, C. M. Clark, Springfield	5

AWARDING COMMITTEE—Geo. W. Williams, Thos. C. Dye and J. V. D. Pettitt.

ENTRIES OF THOROUGHBRED HORSES.

1. David Law, Willoughby, Lake co., stallion, Perfection, 4 years old.
2. J. W. Fitch, Cleveland, O., stallion, Col. Greyson, (chestnut), 12 years old.
3. Moses Simmons, do gelding, Frank Grayson, (sorrel), 3 do
4. M. Richardson, do stallion, Gray Eagle, jr., 6 years old.
5. Anderson & McMillan, Xenia, O., stallion, Ben Buttler, 4 years old.
6. John Tod, Cleveland, O., mare, Grace Tod, 3 years old.
7. do do do Sallie Tod, 2 do
8. S. Alexander, Jamestown, O., stallion, Boston, 5 years old.
9. do do do Dan Webster, 7 years old.
10. do do do Woodford, 2 do
11. Chas. Herrick, Warrensville, O., stallion, 1 year old.
12. Chas W. Brainard, Brooklyn, O., mare, 2 years old.
13. M. M. Spangler, Cleveland, stallion, Boston, 6 years old.
14. N. C. Baldwin, do brood mare, Lizzie, 6 years old.
15. Wm. A. Neil, jr., London, O., stallion, Mickey Free, jr., 3 years old.

PREMIUMS AWARDED ON HORSES—THOROUGHBRED.

Best Stallion, 4 years old and over, J. W. Fitch, Cleveland	$50
2d best do, Anderson & McMillan, Xenia	25
Best Stallion, 2 years old and under 3, S. Alexander, Jamestown, O	20
Best Stallion, 3 years old and under 4, Wm. A. Neil, jr., London, O	25
Best Brood Mare, 3 years old and under 4, J. Tod, Cleveland	20
Best Brood Mare, 2 years old and under 3, John Tod	15

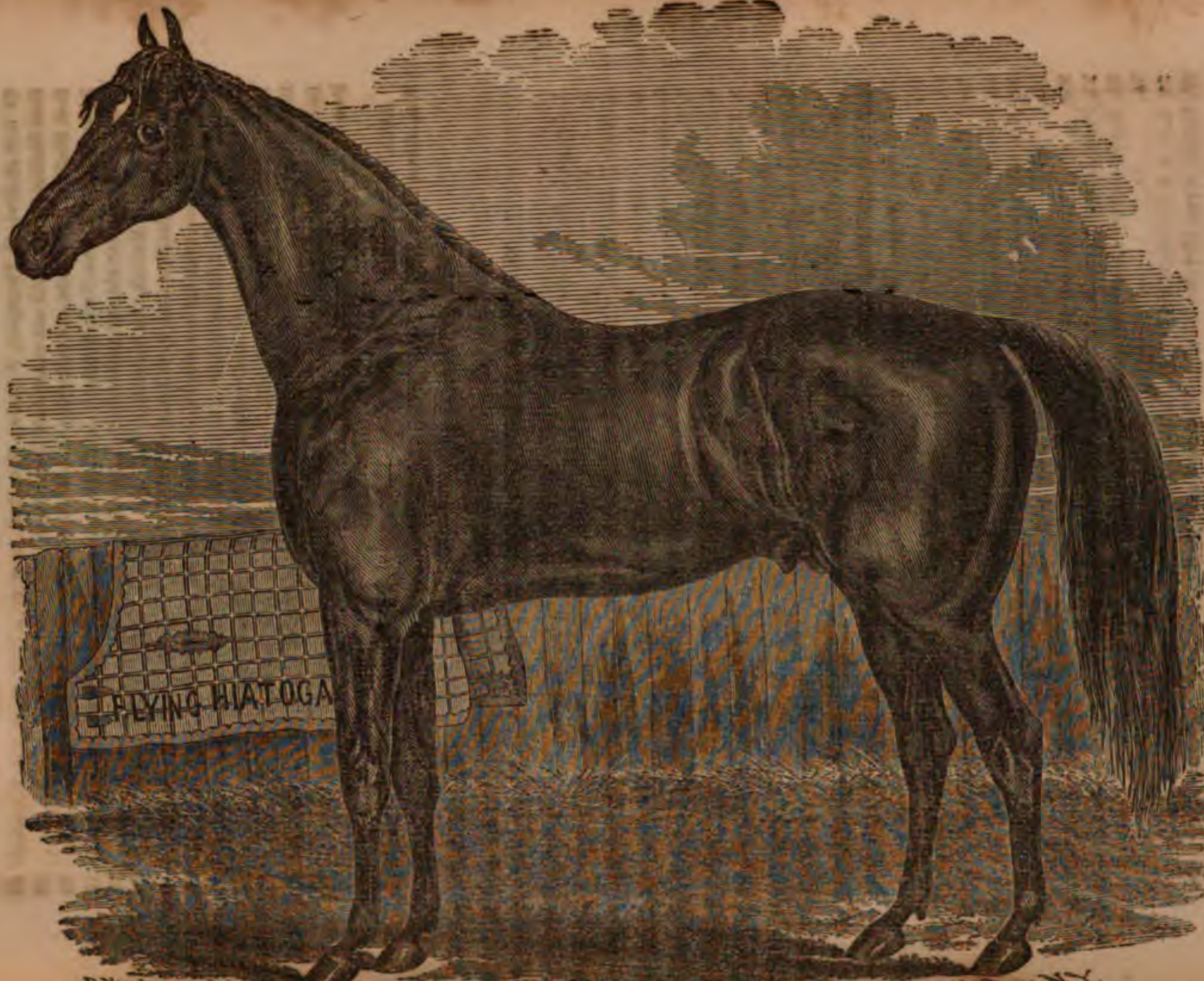
AWARDING COMMITTEE—Geo. W. Willliams, Erastus Spencer, Jas. Buckingham, John S. Rary and Jas. M. Brown.

ENTRIES IN ROADSTERS.

1. W. P. Irwin, North Fairfield, Huron county, stallion, John C. Heenan, bay, 6 years old.
2. M. M. Spangler, Cleveland, stallion, Boston, bay, 6 years old.
3. Solomon Finicle, Mansfield, O., stallion, Honest Bill, 8 years old.
4. A. C. Welsh, do do Grey Eagle, 5 do
5. John Martin, Cleveland, gelding, Frank Leslie, 7 years old.
6. E. H. Keith, Geneva, Ashtabula county, stallion, Simcoe Chief, 5 years old.
7. James Brown, Twinsburg, Summit county, do McClellan, 2 do
8. J. M. Southam, Hinkley, Medina county, mare, Lucy, 1 year old.
9. Geo. Howlett, Cleveland, O., mare, Lady Forest, 2 years old.
10. J. T. & D. B. Updegraff, Mt. Pleasant, O., stallion, bay, 10 years old.
11. Dr. J. T. Updegraff, do mare, Laura Kent, 4 years old.
12. do do mare colt, Minnie.
13. W. J. Waterson, Cleveland, O., brood mare, 4 years old.
14. do do sucking colt (horse).
15. W. B. Waddle, do mare, Kitty Girley, 3 years old.
16. H. C. McDonell, do do Jewess, 3 do
17. John Martin, do do Buckskin, 8 do
18. E. A. Fuller, Columbus, O., mare, 6 years old.
19. E. Hagen, Willougby, O., stallion, William, 8 years old.
20. do do do Sherman, 6 do
21. James M. Brown, Massillon, O., stallion, Young St. Lawrence, 6 years old.
22. Jacob Miller, Ebberville, Medina county, stallion, Henry Clay, 4 do
23. Charles Porter, Hinckley, O., stallion, Flying Pilgrim, 4 years old.
24. M. Stevenson, Brunswick, O., do Morgan Stranger, 3 do
25. Fuller & Stimson, Brooklyn, O., do 2 years old.
26. Geo. B. Senter, Cleveland, O., do Bay Horse, 4 years old.
27. S. C. Tibbets & Co., Cleveland, O., stallion, Henry Clay, jr., 9 years old.
28. James H. Taylor, Seville, O., do Corkscrew, 5 do
29. do do brood mare, 7 years old.
30. J. F. Pond, Cleveland, O., sucking horse colt.
31. Wathel Baldwin, Chester Hill, Morgan county, stallion, Jo Clifford, 8 years old.
32. Fred Reed, Brunswick, O., brood mare, 7 years old.
33. H. H. Peters, do stallion, Dan Tucker, 6 years old.
34. R. Thompson, Johnson, Trumbull county, stallion, Excelsior, 11 years old.
35. Chas. Herrick, Warresnville, O., stallion, no name, 1 year old.
36. Wm. C. Hosmer, Troy, Geauga county, brood mare, 5 years old.
37. L. D. Gibson, Berlin, O., mare, 6 yaars old.
38. E. J. Acruff, Meadville, Pa., stallion, Hambletonian, 4 years old.
39. do do do Grey Miller, 1 do
40. C. B. Cobb, Akron, O., do Jerry Arnold, 4 do
41. J. K. McVeigh, Warrensville, O., do Charles, 3 do
42. do do do Frank, 3 do
43. Robert Anderson, Columbia Station, O., stallion, Albino, 8 years old.
44. S. W. Blakeslee, Royalton, O., stallion, Bonny Scotland, 2 do

PREMIUMS AWARDED ON ROADSTERS.

Best Stallion, 4 years old and over, "Flying Hiatoga," J. T. & D. B. Updegraff, Mt, Pleasant. $ 40


FLYING HIATOGA
R. Vanduzen del.
J. W. Orr N.Y.

PREMIUMS AWARDED ON ROADSTERS—CONTINUED.

2d best stallion, P. Thompson, Johnston, Trumbull county	20
Best Stallion, 3 years old and under 4, M. Stephenson, Brunswick, O	20
Best Stallion, 2 years old and under 3, Fuller & Stimson, Brooklyn, O	20
2d best, James Brown, Twinsburgh	10
Best Stallion, 1 year old and under 2, E. J. Acruff, Meadville, Pa	15
2d best, Charles Merrick, Warrensville, O	10
Best Suckling Stallion Colt, J. F. Pond, Cleveland	10
Best Brood Mare, over 4 years old, Dr. J. T. Updegraff, Mt. Pleasant O	30
2d best, E. A. Fuller, Columbus, O	20
Best Brood Mare, 3 years old and under 4, W. B. Waddle, Cleveland	20
2d best, H. C. McDowell, Cleveland	15
Best Brood Mare, 2 years old and under 3, Geo. Howlett, Cleveland	15
Best Filly, 1 year old and under 2, J. M. Southam, Hinckley, O	10
Best Suckling Mare Colt, Dr. J. T. Updegraff, Mt. Pleasant, O	10

AWARDING COMMITTEE—J. W. Kesey, Jas. Fullington, E. M. Bennett, Geo. W. Williams and Wm. Alstorf.

ENTRIES IN HORSES FOR GENERAL PURPOSES.

1. Joseph L. Beck, River Styx, Medina county, mare, Dolly, 8 years old, bay.
2. do do do stallion, Bill, 2 do do
3. Mark Hebblethwaite, Cleveland, O., stallion, Dan Webster, 4 years old and over, brown.
4. do do do Young Volunteer, 6 years old, bay.
5. Robert Spinks, do do Kentucky Private, 3 do sorrel.
7. R. H. Lodge, do do Prince, 3 do bay.
8. Robert Burrow, Markham, C. W., do Walter, 7 do
9. T. Boynton, Willoughby, O., do Prince, 2 do do
10. do do do Jim, 2 do do
11. Wm. H. Wilson, Xenia, O., do Bellfounder Chief, 7 do
12. Phillip Powell, London, O., do Sam Hazard, 3 do
13. Moore P. Vinnage, Jone's Station, Butler county, stallion, Young Belmont, 7 years old.
14. J. T. & D. B. Updegraff, Mt. Pleasant, stallion, bay, 10 years old.
15. J. T. Updegraff, do mare, Kate, 4 do
16. do do filly, 2 do
17. do do suckling horse colt.
18. J. D. Mapes, Orange, Cuyahoga county, stallion, Green Mountain Boy, 5 years old.
19. Minoris Akin, Brooklyn, O., mare, Digitalis, 3 years old.
20. Wm. Mills, Orange, O., mare, Fox, 5 years old.
21. do do suckling mare colt.
22. do do mare, Fanny, 4 years old.
23. Noah Longanecker, Guilford, Medina county, stallion, Frank, 7 years old.
24. Martin Carroll, Painesville, O., brood mare, 6 years old.
25. do do do 4 do
26. L. S. & S. C. Crimm, Gallion, O., stallion, Capt. Fairfield, 7 years old.
27. Luther Moses, Cleveland, O., suckling horse colt.
28. do do do mare do
29. Albert Porter, Tallmadge, O., stallion, Prince Orion, 4 years old.

31. A. G. Hatch, Grainger, Medina county, stallion, Young Stranger, 4 years old.
33. W. H. Tripp, Wellington, O., mare, Topsy, 4 years old, (harness).
34. Collin Arnold, Warrensville, O., mare, Fan, 13 years.
35. do do suckling horse colt.
36. G. W. Roberts, Benlinville, Erie county, stallion, Indian Chief, 2 years old.
37. Chester Lamb, Welchfield, Geauga county, stallion, Searcher, 12 years old.
38. do do do Champion Searcher, 6 years old.
39. do do do Young Searcher, 3 do
40. do do do Champion Searcher, jr., 3 years old.
41. do do mare, Lady Buckingham, 3 do
42. Avery Cross, Suffield, Portage county, stallion, Francisco, 4 years old.
43. Horace Metcalf, Chardon, O., mare, 4 years old.
44. La Grange Tyler, Newburgh, O., mare, 3 years old.
45. J. H. Taylor, Seville, O., mare, Biddy, 3 years old.
46. E. A. Young, Breckville, O., stallion, Wake up Jack, 8 years old.
47. John Houser, Marshallville, Wayne county, stallion, May Duke, 7 years old.
48. T. N. Davis, Cleveland, O., Mare, Lady Davis, 7 years old.
49. Geo. L. Shipman, Norwalk, O., stallion, Kennebeck, 14 years old.
50. John Whitbeck, do do Mambrino Chief, 2 years old.
51. E. T. & J. B. Curtis, Farmington, O., brood mare, 6 years old.
52. do do do 6 do
53. Michael Oster, Cleveland, O., stallion, Albert, 6 do
54. John B. Robinson, jr., Amherst, O., mare, 9 do
55. S. C. Canfield, Bridge Creek, Cuyahoga county, mare, Flora, 3 years old.
56. B. L. Griffin, Oberlin, O., mare, 3 years old.
57. Jacob Miller, Ebberville, O., stallion, Emperor, 4 years old.
58. Charles M. Brainerd, Brooklyn, O., mare, 2 years old.
59. W. C. Hosmer, Troy, Geauga, O., stallion, Billy, 4 years old.
60. do do mare, Dolly, 9 do
61. do do suckling stallion, 3 months old.
62. do do mare, Jenny, 3 years old.
63. W. C. Hosmer, Troy, Geauga county, O., mare, Coxy, 2 years old.
64. James Keckland, Gate's Mills, stallion, Arabian Postboy, 5 years old.
65. E. S. Perkins, Waymouth, O., do Union, 6 do
66. L. A. Savage, Chagrin Falls, do Black Hawk Morgan, 7 years old.
67. Hiram Sykes, Hinkley, O., do Eastman Morgan, 14 do

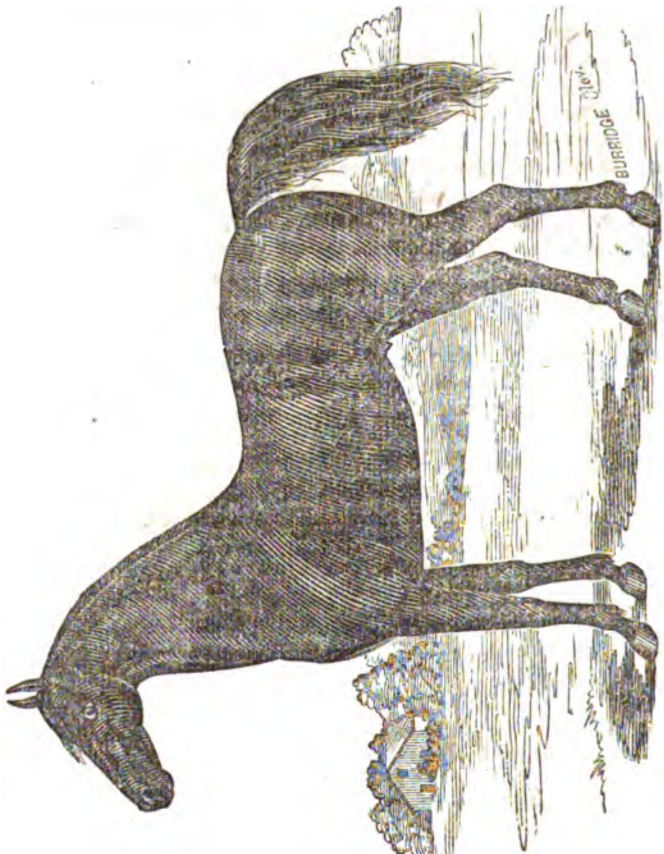
AWARDS ON HORSES FOR GENERAL PURPOSES.

Best Stallion, 4 years old and over, Chester Lamb, Welchfield, O.	$40
2d best, L S. & S. C. Crimm, Galion	20
3d best, J. T. & D. B. Updegraff	10
Best Stallion, 3 years old and under 4, Chester Lamb, Welchfield, O.	20
2d best, D. T. Boynton, Wilioughby	15
Best Stallion, 2 years old and under 3, G. W. Roberts, Berlinville, O.	20
2d best, J. L. Beck, River Styx, Medina county, O.	10
Best Suckling Stallion Colt, Dr. J. T. Updegraff, Mt. Pleasant, O.	10
2d best, C. Arnold, Warrensville, O.	5
Best Brood Mare, over 4 years old, Dr. J. T. Updegraff, Mt. Pleasant	30
2d best, Wm. Mills, Orange	20
Best Brood Mare, 3 years old and under 4, B. L. Griffin, Oberlin	20

2d best, C. Lamb, Welchfield	$15
Best Brood Mare, 2 years old and under 3, Dr. J. T. Updegraff, Mt. Pleasant	15
2d best, W. C. Hosmer, Troy, Geauga	10
2d best suckling Mare Colt, Wm. Mills, Orange	5

Awarding Committee—Abel Krum, James Buckingham, Jas. Fullington, John Sears and James M. Brown.

Old Searcher, owned by Chester Lamb, Troy, Geauga county, Ohio. Searcher was got by the celebrated horse Barney Henry, owned by Mr. Barney, of Whitehall; he by Signal, and he by imported Margrave. The dam of Searcher was a Morgan mare, owned by Samuel Moore, in the town of Shoreham, Vermont. She could trot a mile in less than three minutes,



OLD SEARCHER.

weighed 1,000 pounds, and was in every respect a most perfect animal. Searcher is of a dark bay color—not a white hair upon him—a heavy flowing black mane and tail, and legs black nearly to his body, is 16¼ hands high, and weighs 1,200 pounds. When four years old he took the first premium at the Addison County Fair, held at Middlebury, Vermont. He also appeared at the Vermont State Fair, held at the same place, on the 10th and 11th of September, 1851, and, in the presence of thousands, and on a heavy sand track, trotted one mile in harness in two minutes and fifty seconds. The track was one-third of a mile around, over which he passed the third time in fifty seconds. This feat he performed, although he had never been trained nor his best speed tested.

Captain Fairfield is a dark bay horse 16½ hands high, weighs 1,350 pounds, and is of much substance, great stamina and fine style. He was bred in Fairfield county, Ohio; was foaled May 20th, 1857; was sired by Young Sir Thomas; dam by Marylander. Young Sir Thomas sired by the Woodyear Sir Thomas; he by Young Diomede; he by imported Diomede. Captain Fairfield is a half brother to the trotting horse known as Captain Fisher, now owned in San Francisco, California, and formerly of Lancaster, Ohio; and also half brother to the roan mare known as Mell Brooks, owned in Cincinnati, and formerly of

CAPTAIN FAIRFIELD.

Lancaster, Ohio. He has trotted his mile in two minutes and fifty seconds, and can show as many good strong boned, and well built and large sized, and as fine styled colts as any horse of his age. One filly, two years and eleven months old, sold for $250. She could trot her mile in three minutes and thirty seconds. Some of his yearling colts have sold for $150 each. At three years old, past, he trotted on the Bucyrus Trotting Park for a purse, against one of Flying Cloud's colts of the same age. Captain Fairfield won the purse in three minutes and four seconds.

ENTRIES IN DRAFT HORSES.

1. John Quinn, Cleveland, O., mare, Doll, iron grey, 6 years old.
2. J. G. Whitney, Conneaut, O., stallion, Duke of Alva, 8 years old.
3. Robert Burrows, Markham Village, C. W., stallion, Sir John Franklin, 7 years old.
4. Samuel Alexander, Jamestown, O., stallion, Monitor, 10 years old.
5. Wm. Pincumbe, Middleburgh, O., mare, Madame, 3 years old.
6. Henry Rush, Liverpool, Medina county, stallion, Charlie, 2 years old.
7. William Mills, Orange, Cuyahoga county, mare, Fanny, 4 years old.
8. Warren Coon, Wakeman, O., stallion, Prince Messenger, 6 years old.

AWARD OF PREMIUMS ON DRAFT HORSES.

Best Stallion, 4 years old and over, S. Alexander, Jameston, O	$30
2d best, R. Burrows, Markham, Canada West	20
Best Stallion, 2 years old and under 3, H. Rush, Liverpool	15
Best Brood Mare, over 4 years old, J. Quinn, Cleveland	30
2d best, W. Mills, Orange, O	20
Best Brood Mare, 3 years old and under 4, W. Pincumbe, Middleburgh, O	20

AWARDING COMMITTEE—Daniel McLean, R. C. Thompson and Lucius Alling.

ENTRIES IN MATCHED HORSES AND MARES.

1. A. P. Leland, Newburg, 1 pair matched coach horses, 8 and 9 years old.
2. Wm. Squires, Copopa, Lorain county, 1 pair matched roadsters, 3 and 4 years old.
3. Theo. Clark, Ravenna, O., light harness mare.
4. S. S. Coe, Cleveland, 1 pair matched roadsters, 8 and 5 years old.
5. J. Peffers, Burton, Geauga county, gelding, light harness, 8 years old, sorrel.
6. Solomon Finicle, Mansfield, O., trotting stallion, Honest Bill, 8 years old.
7. Israel Clark, Cleveland, O., 1 pair matched roadsters, Pet and Rob Roy, 4 years old.
8. Geo. H. Bent, do do do geldings, roadsters, Charlie and May Duke, 7 and 5 years old.
9. Geo. H. Bent, Cleveland, O., gelding Charley, 7 years old.
10. A. Stone, jr., do 1 pair coach horses, 8 and 9 years old.
11. A. H. Carpenter, Bennett's corners, Medina county, 1 pair matched roadsters, 4 years old.
12. James Brown, Twinsburg, Summit county, gelding, light harness, Maumee Col., 4 do
13. W. S. Parker, Madison, Lake county, 1 pair carriage geldings, Bill and George, 4 do
14. Wm. Edwards, Cleveland, 1 pair matched roadsters, Maggie and Frank, 7 and 8 do
15. M. Richardson, do saddle mare, 4 years old and over.
16. D. E. Hier, Bennett's corners, Medina county, 1 pair draft horses, 4 years old.
17. J. M. Southam, Hinckley, Medina county, gelding, Pet, light harness, 6 years old.
18. F. A. Bacon, Independence, 1 pair matched roadsters, mares.
19. Z. S. Spalding, Cleveland, gelding, Eclipse, saddle, 4 years old.
20. S. S. Coe, do light harness mare, Nellie.
21. J. O. Mason, do gelding, harness, Major, 7 years old.
22. Harvey Stevens, do 1 pair matched roadsters.
23. D. B. Updegraff, Mt. Pleasant, 1 pair coach horses, Dan and Prince, over 4 years old.
24. do do saddle gelding, Prince, 5 years old.
25. do do light harness gelding, Morgan.

26. L. M. Watt, Findley, Hancock county, 1 harness gelding.
27. H. S. Olmsted, Cleveland, 1 harness gelding.
28. Dr. J. T. Updegraff, Mt. Pleasant, 1 pair matched roadsters, Jennie and Laura.
29. do do family saddle mare, Jennie Mitchell.
30. do do do Fanny Ellsler.
31. A. C. Baldwin, Cleveland, 1 pair matched coach horses.
32. Israel Hubbard, do do do mares, roadsters.
33. William Brown, East Rockport, Cuyahoga county, 1 pair matched coach horses, Jenny and Nancy.
34. T J. Towson, Cleveland, light harness gelding.
35. Edward Costals, do 1 pair draft horses, over 4 years old.
36. G. F. Hutchings, Litchfield, Medina co., 1 saddle gelding.
37. Wm. G. Yates, Cleveland, 2 pair coach horses.
38. John Tod, Cleveland, 1 harness gelding, over 4 years old.
39 Wm. Bulson, Holmesville, Holmes county, 1 saddle gelding.
40. H. A. Smith, Cleveland, O., 1 harness mare.
41. Fitch Adams, do do do
42. W. H. Patts, do do gelding.
43. J. P. Ross, do 1 pair roadsters, mares.
44. C. H. Sargent, do 1 saddle gelding, Rube, 8 years old.
45. L. C. Sturgis, Litchfield, O., do
46. N. Van Loon, Worthington, O., gelding, harness, Tom Morgan.
47. E. A. Fuller, Columbus, O., do Black Boy.
48 J. G. Hussy, Cleveland, pair coach mares, Maggie and Fannie, 7 and 8 years old.
49. Geo. Sprague, do harness mare, Minnie, 5 years old.
50. D. C. Kellogg, Munsen, Geauga co., pair coach mares, Kitt and Clara, 6 years old.
51. E. Bassett, Milan, O., pair matched roadsters, mares, 4 and 6 years old.
52. A M. Binke, Newburgh, O., pair matched geldings, Frank and John, 5 and 6 years old.
53. R. B. Colton, Rootstown, O., pair coach horses, Dick and Charley, 5 years old.
54 E L. Jones, Shelby, O., 1 gelding, Bill, (family horse), 5 years old.
55. Jas. M. Brown, Massillon, family mare, 23 years old.
56. W. S. Dunn, Cleveland, pair matched roadsters, mares, 6 years old.
57. Anson Stager, do 1 gelding family horse, 7 years old.
58. J. P. Ross, do 1 harness gelding, Sam, 5 do
59. H. N. Slade, Solon, O., do Prince, 7 years old.
60. Royal Taylor, do saddle gelding family horse.
61 Luther Moses, Cleveland, 1 harness gelding, Charlie, 8 years old.
62. Fullerd Stimon, Brooklyn, O., 1 pair matched roadsters.
63. do do do
64. do do 1 harness mare, Maggie Mitchell.
65. A. O. Cortrell, Willoughby, O., 1 pair coach horses, 6 years old.
66. do do harness gelding, Tiff, 6 do
67. do do do Teddy, 6 do
68. Reuben Stickney, Brooklyn, O., do Flying Cloud, 6 years old.
69. G. W. Roberts, Berlinville, Erie county, harness gelding, Jersey, 6 years old.
70. S. S. Beecher, Garrettsville, O., harness gelding, Tom, 4 years old.
71. do do 1 pair coach horses, 4 do
72. A. W. Brainard, Newburgh, O., mare, Nelly, over 4 years old.
73 E. E Sheldon, Avon, O., mare Maggie Bowers, 4 do
74. W. B. Sheldon, Cleveland, pair coach horses, geldings, 5 years old.
75. do do harness mare, Black Maria, 5 do
76. J. H. Woodman, do 1 pair coach mares, 4 years old.

77. J. W. Bedford, Willoughby, O., 1 pair draft horses, 7 years old.
78. Levi Wolff, Independence, O., pair farm and draft mares, years old.
79. Mr. Wright, Cleveland, harness mare, Lady, 8 years old.
80. George L. Sprague, Huron, Erie county, pair matched roadsters, mares, Jennie and Belle 6 years old.
81. George L. Sprague, Huron, Erie county, harness mare, 6 years old
82. J. R. Sanford, Cleveland, harness gelding, 6 years old.
83. W. R. Davis, Weymouth, Medina county, harness gelding, 5 years old.
84. E. Driggs, Medina, O., harness mare, 10 years old.
85. J. H. Taylor, Seville, O., harness gelding, Shot, 5 years old.
86. do do saddle gelding, Buckeye, 5 years old.
87. H. Rodgers, Cleveland, 1 pair matched roadsters.
88. D. M. Wooster, Pittsfield, 1 pair do do.
89. A. Kellogg, Cleveland, 1 pair farm or draft horses, 5 and 7 years old.
90. do do 1 saddle gelding, 7 years old.
91. R. Comstock, Bedford, O., 1 pair matched coach horses.
92. W. L. Baker, Madison, Lake county, 1 gelding, in light harness.
93. Wm. D. Lindley, Sandusky City, O., 1 pair matched roadsters.
94. H. B. Hurlburt, Cleveland, 1 pair coach horses.
95. Wathel Baldwin, Chester Hill, Morgan county, saddle mare.
96. H. Peters, Milan, Erie county, saddle gelding, Young Stranger, 4 years old.
97. E. Fuller, Coolville, Athens county, gelding family horse, Prince, 7 years old.
98. E. C. Rice, Troy, O., harness gelding, Fred., 7 years old.
99. George W. Wadsworth, Cleveland, O., family horse.
100. E. R. Felton, harness mare, 7 years old.
101. Edward Byington, Elyria, pair matched roadsters, black geldings, 6 years old.
102. M. J. Drake, Cleveland, bay gelding, in harness, 8 years old.
103. Henry Frissell, do do do 7 do.
104. Wm. Hoffman, do bay mare, do 7 do.
105. J. C. Corning, do pair matched roadsters, 4 do.
106. Lorenzo Dunham, Bedford, O., pair matched farm horses.
107. L. Crawford, Cleveland, saddle gelding.
108. do do light harness mare.
109. American Express Company, Cleveland, family horse.
110. Frank Hurd, Cleveland, gelding, in harness.
111. J. G. Bruggeman, Cleveland, light harness mare.
112. J. D. Bishop, do do gelding.
113. Wm. W. Battle, Brighton, Lorain county, 1 pair roadsters, mares, in light harness.
114. H. K. Boylston, Cleveland, 1 pair farm draft horses.
115. C. C. Briggs, do family mare.
116. Benjamin Finley, Chagrin Falls, O., gelding, in light harness.
117. D. B. Marker, Pittsburg, Pa., 1 pair coach horses.
118. Hawkins & Howe, Akron, O., gelding, in light harness.
119. T. M. Bartlet, Cleveland, gelding, in light harness.
120. K. Sherman, do 1 pair match roadsters.
121. Philo Thompson, Johnson, Trumbull county, trotting stallion.
122. Lafayette Brush, Laporte, Lorain county, harness gelding, Blackhawk, 5 years old.
123. O. J. Peck, Wellington, O., harness mare, Kate, 6 years old.
124. Jerome Chidsey, Weymouth, O., pair match roadsters, 6 years old.
125. do do gelding, Frank, family horse, 6 years old.
126. R. B. Colton, Rootstown, O., harness gelding, Charley, 5 years old.
127. Oscar Wilbur, Weymouth, O., pair matched roadsters, 4 years old.

128. Z. R. Eggleston, Auburn, Geauga county, family mare.
129. Gideon Wilbur, Brunswick, O., harness gelding, Morgan, 4 years old.
130. R. A. Button, Mesopotamia, O., pair coach mares, 6 and 7 years old.
131. Newton Wells, Mentor, Lake county, pair draft horses, geldings, 7 years old.
132. Jacob Foster, Brunswick, O., pair coach mares.
133. George Steadman, Lagrange, O., pair coach geldings, 4 years old.
134. P. J. Price, Cleveland, O., pair matched roadsters, 6 and 7 years old.
135. Wm. A. Neil, jr., London, O., stallion, Spartan, family horse, 7 years old.
136. A. C. Armstrong, Cleveland, gelding, in light harness.
137. D. W. Burrows, Newburg, O., pair matched roadsters, 7 and 8 years old.
138. H. L. Morgan, do horse of all work, in harness.
139. G. W. Hart, Stowe, O., roadster mare, in harness, 6 years old.
140. Richard Carr, Cleveland, harness gelding, 10 years old.
141. E. J. Acruff, Meadville, Pa., light harness mare.
142. Horace Beake, Newburg, O., harness gelding, Sorrel Billy, 8 years old.
143. G. R. Starr, Neelington, O., harness gelding.
144. C. T. Reed, Solon, O., pair farmers' draft horses.
145. Samuel Whitney, Mayfield, gelding, in harness.
146. J. W. Hoyt, Cleveland, mare, in light harness.
147. Jackson Hall, Cleveland, mare, in light harness.
148. E. Rockwood, Carlisle, pair horses, light harness roadsters.
149. O. K. Starr, Penfield, light harness mare, 5 years old.
150. C. M. Furguson, Cleveland, roadster gelding.
151. F. H. Hinman, Cleveland, harness mare.
152. F. Howe, Warrensville, pair farmers' draft horses, 10 years old.
153. S. P. Dunn, Cleveland, light harness gelding.
154. James Taylor, Litchfield, O., light harness gelding.
155. George E. Senter, Cleveland, family horse.
156. E. J. White, Bedford, O., pair matched roadsters, 4 years old.
157. C. J. Madison, Cleveland, light harness gelding.
158. Edward Rice, Troy, pair farm horses, geldings.
159. D. E. Stearns, Berea, Harness gelding.
160. G. L. Shipman, Norwalk, trotting stallion, Kennebec.
161. J. H. Gorham, Cleveland, light harness mare.
162. Wm. Flower, Akron, O., light harness gelding.
163. E. Russell, Cleveland, trotting mare.
164. A. C. Ramorn, Cleveland, harness gelding, 8 years old.
165. S. A. Savage, Chagrin Falls, O., saddle mare.
166. Moses Simmons, Cleveland, harness gelding, Frank Greyson, 4 years old.
167. G. W. McMillan, do harness mare, Lady Mac, 4 years old.
168. S. S. Worralls, Willoughby, O., pair draft horses.
169. D. K. Tilden, Cleveland, O., harness gelding, 4 years old.
170. Hiram Roe, North Bloomfield, O., trotting gelding, 6 years old.
171. R. P. Myers, Cleveland, light harness gelding, 5 years old.
172. L. J. Farnam, do do mare.
173. S. D. McMillan, do do gelding.
174. B. A. Bragg, do saddle gelding, 6 years old.
175. do do do Frank Forrester, 6 years old.
176. Miss L. A. Sumner, Cleveland, harness mare, Lady Belle, 4 years old.
177. John Webster & Co., do pair coach horses.
178. Sylvester Smith, Jefferson, O., pair matched roadsters.

179. W. M. Flanagan, West Jefferson, Madison county, light harness gelding, Grey Eagle, 6 years old.
180. W. W. Richards, Solon, O., light harness gelding.
181. Fuller & Stimson, Brooklyn, O., pair matched farm geldings.
182. W. H. Widdecomb, Cleveland, light harness mare.
183. A. S. Hayden, Collamer, O., pair coach ponies.
184. E. Hazen, Willoughby, O., pair matched roadsters.
185. S. L. Mather, Cleveland, pair coach horses.
186. John Dowd, Euclid, saddle mare.
187. Johnson Glazier, Bedford, pair matched roadsters.

PREMIUMS AWARDED ON MATCHED HORSES AND MARES.

Best pair coach horses, A. Stone, jr., Cleveland	$20
2d best do., R. B. Colton, Rootstown	10
Best pair farm or draft horses or mares, H. K. Boylesten, Cleveland	20
2d best do., Fuller and Stimson, Brooklyn	10
Best matched roadster, J. P. Ross, Cleveland	20
2d best do., W. Edwards, Cleveland	10

PREMIUMS AWARDED ON GELDINGS AND MARES FOR HARNESS, SADDLE, ETC.

Best gelding for light harness, 4 years old and over, N. Van Loon, Worthington	$20
2d best do., J. P. Ross, Cleveland	10
Best mare for light harness, 4 years old and over, Fitch Adams, Cleveland	20
2d best do., H. A. Smith	10

EXHIBITED UNDER SADDLE.

Best family horse or mare, A. Stager, Cleveland	$20
2d best do., Dr. J. T. Updegraff	10
Best mare for saddle, 4 years old and over, Dr. J. T. Updegraff, Mount Pleasant	20
2d best do., N. Baldwin, Chester Hill	10
Best gelding for saddle, 4 years old and over, D. B. Updegraff, Mount Pleasant	20
2d best do., L. C. Sturgis, Litchfield	10

TROTTERS.

Best and fastest trotting mare or gelding, N. Van Loon, Worthington	Silver Medal
Best and fastest trotting stallion, Phiolo Thompson, —— Johnson	Silver Medal

AWARDING COMMITTEE—D. B. Anderson, L. W. Crittenden, James M. Brown, L. G. Delano.

ENTRIES IN HORSES—SWEEPSTAKES.

1. J. W. Fitch, Cleveland, stallion, Col. Greyson, chesnut, 12 years old.
2. Solomon Finicle, Mansfield, stallion, Honest Bill, 8 years old.
3. Alexander C. Welch, Mansfield, stallion, Grey Eagle, 5 years old.
4. Robert Burrows, Markham Village, C. W., stallion, Sir John Franklin, 7 years old.
5. E. H. Keith, Geneva, O., stallion, Seminole Chief, 5 years old.
8. Anderson & McMillan, Xenia, stallion, Ben Butler.
9. M. P. Virundger, Jones' Station, Butler county, stallion, Young Belmont.

10. J. T. & D. B. Updegraff, Mount Pleasant, stallion, Dan Rice, 10 years old
11. do do do do Flying Hiatoga.
12. do do do do Dan Rice.
13. J. T. Updegraff, do mare, Laura.
14. Dr. J. T. Updegraff, Mount Pleasant, O., mare, Laura.
15. do do do Fanny.
16. do do do Jenny.
17. do do do Kate.
18. N. Van Loon, Worthington, O., gelding, Tom Morgan, 4 years old.
19. E. A. Fuller, Columbus, mare, 6 years old.
20. Albert Porter, Tallmadge, O., stallion, Prince Orion, 4 years old.
21. M. Stevenson, Brunswick, O., do Morgan Stranger.
22. Fuller & Stimson, Brooklyn, O., stallion, 2 years old.
23. do do mare, Lucy, 5 years old.
24. S. Alexander, Jamestown, O., stallion, Boston.
25. do do do Dan Webster.
26. H. H. Peters, Brunswick, O., do Dan Tucker.
27. Chester Lamb, Welshfield, O., do Searcher, 12 years old.
28. do do do Champion Searcher, 6 years old.
29. do do do Searcher, and 5 colts.
30. L. C. Tibbits & Co., Cleveland, do H. Clay, jr., 6 years old.
31. J. H. Taylor, Seville, O., do Corkscrew.
32. S. C. Canfield, Bridge Creek, O., mare, Flora, 3 years old.
33. William J. Hosmer, Troy, Geauga county, brood mare, 5 years old.
34. Philo Thompson, Johnson, Trumbull county, stallion, Excelsior, 11 years old.
35. H. Metcalf, Chardon, O., mare, Kitty, over 4 years old.
36. E. J. Acruff, Meadville, Pa., stallion, Hambletonian, 4 years old
37. G. L. Shipman, Norwalk, O., stallion, Kennebec, 14 years old.
38. John Whitbeck, do do Mambrino Chief, 2 years old.

PREMIUMS AWARDED ON SWEEPSTAKES ON HORSES.

Best stallion of any age or breed, Anderson & McMillan, Xenia.......................... $50
Best mare, Dr J. T. Updegraff, Mount Pleasant...................................... 50
Best 5 colts, 3 years old and under, sired by any one horse, and the sire to be exhibited with his colts; style, size and action to be specially considered, Chester Lamb, Welchfield.. 40

AWARDING COMMITTEE—Wm. A. Neil, jr., J. W. Shinn, E. M. Bennett, A. P. Howard.

In the class of Jacks and Mules there were 15 entries. The awards were as follows:

JACKS AND MULES.

Best Jack, 3 years old and over, J. G. Whitney, Conneaut.......................... $25
do 3 years old and under, G. Lewis, Worthington.................................. 15
do 2 years old and under, A. P. Leland, Newburgh.................................. 5
Best Jennet, 3 years old and over, Isaac Powell, Fitchville............................ 15
Best pair mules, 2 years old and over, Isaac Powell.................................. 10
Best pair mule colts, A. P. Leeland, Newburgh...................................... 5

AWARDING COMMITTEE—Joseph Clark, B. S. Runyon and A. Boughton.

SHEEP.

In the class of Saxony's there were no entries.

In the class of Merinos there were 83 entries, comprising upwards of three hundred head of sheep. The awards were as follows:

MERINOS.

Best Buck, 2 years old and over, Thos. Gorby, Randolph, Ohio	$15
2d best do., A. K. Karr, Shoreham, Vt	10
Best Buck, under 2 years, S. D. Karr, Shoreham, Vt	15
2d best do., John Duncan, Sidney, O	10
Best pen of 5 ewes, 2 years old and over, Thos. Gorby, Randolph O	15
2d best do., Robert Perrine, Patterson Mills, Pa	10
Best pen of 5 ewes, under 2 years, J. S. Delano, Mt. Vernon, O	15
2d best do., Thos. Gorby, Randolph O	10
Best pen of 5 lambs, regardless of sex, Karr, Carey & Co., Carey, O	10
2d best do., John Duncan, Sidney, O	5

AWARDING COMMITTEE—H. J. Conklin, Charles M. Clark, Eli Keller and Chas. Phillis.

In the class of Silesians there were 3 entries only. The following is a list of the awards, and the report of the committee:

SILESIANS.

Best Buck, 2 years old and over, Robert Perrine, Patterson Mills, Pa	$15
Best pen of 5 ewes, 2 years old and over, Carey & Starr, Carey, O	15
Best pen of 5 ewes, under 2 years old, H. J. Starr, Carey, O	15

REPORT OF COMMITTEE.

The undersigned having been appointed a committee to examine the above described sheep would report: That they have examined the same, and are of the opinion that H. J. Starr is entitled to a premium on five ewes, one year old; that Carey & Starr should have a premium on five ewes, 2 years old and over; and that Robert Perrine is entitled to a premium on his buck. We would say that we did not come to this conclusion in consequence of any particular excellence in the sheep exhibited, but rather in consideration of the fact that, in our opinion, they are a class of sheep that are likely to be wanted.

All of which is respectfully submitted.

LUCIUS WARNER,
WM. B. SHAW.

In the class of Leicesters there were 17 entries. The following is a list of the awards, and the report of the committee:

LONG WOOL SHEEP—LEICESTERS.

Best Buck, 2 years old and over, John Chamberlain, Avon, O	$15
Best Buck, under 2 years old, John Chamberlain, Avon, O	15
Best pen of 5 ewes, over 2 years old, John Chamberlain, Avon, O	15
Best pen of 5 ewes, under 2 years, John Chamberlain, Avon, O	15
Best pen of 5 lambs, regardless of sex, John Chamberlain, Avon, O	10

REPORT OF COMMITTEE.

Your committee have been pleased with the exhibition of Leicester sheep. We have made the awards as noted in the margin. We will briefly say that we believe this breed of sheep ought to be encouraged on account of their wool, but especially for the mutton, they being a class of sheep that very readily fatten.

THOS. THORNLOE,
WM. BRIGGS,
JOHN BRENTNALL.

In the class of Cotswolds there were 12 entries. The awards were as follows:

LONG WOOL SHEEP—COTSWOLDS.

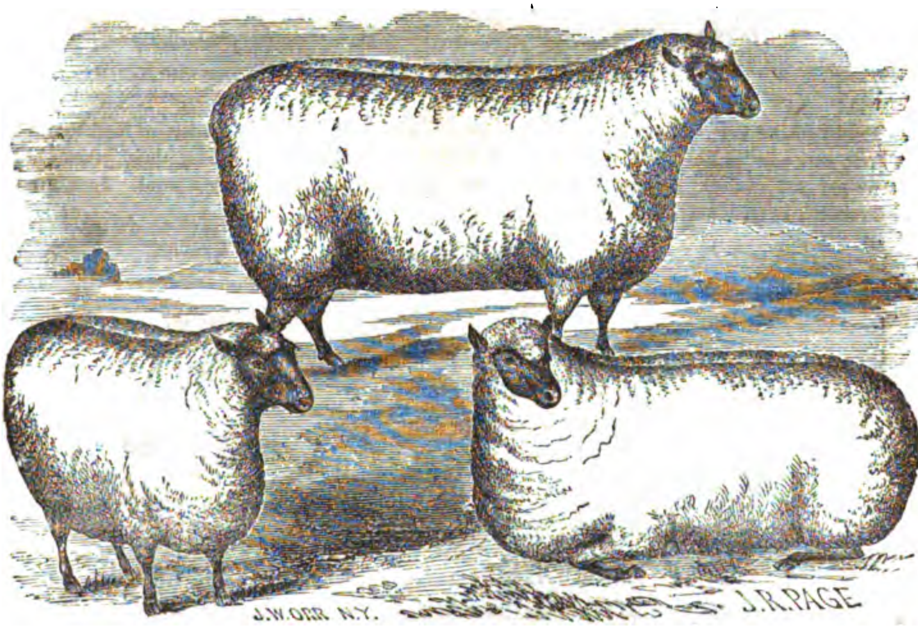
Best Buck, 2 years old and over, N. L. Chaffee, Jefferson, O	$15
Best Buck, under 2 years, Wm. Squires, Copopa, Lorain co., O	15
Best pen of 5 ewes, 2 years old and over, T. Aston, Elyria, O	15
Best pen of 5 ewes, under 2 years, Thos. Aston, Elyria, O	15
Best pen of 5 lambs, regardless of sex, Thos. Aston, Elyria, O	10

AWARDING COMMITTEE—J. D. Easton, F. P. Vergon and J. Parke Alexander.

In the classes of Southdowns and Fat Sheep there were 32 entries. The following is a list of the awards:

SOUTHDOWN SHEEP.

Best Buck, 2 years old and over, N. L. Chaffee, Jefferson, O	$15
Best Buck, under 2 years, S. Toms, Elyria, O	15
Best pen of 5 ewes, 2 years old and over, S. Toms, Elyria, O	15
Best pen of 5 ewes, under 2 years, S. Toms, Elyria, O	15
Best pen of 5 lambs, regardless of sex, J. T. Whitlam, Barry, O	10



SOUTHDOWN BUCK "CHARLEY,"

Owned by N. L. Chaffee, Jefferson, Ashtabula co., O. The Southdown Buck represented in this cut took the First Premium at Ohio State Fair, at Cleveland, in 1863. He is two years old, and bred directly from the flock of Jonas Webb's, of Babraham, Cambridgeshire, England.

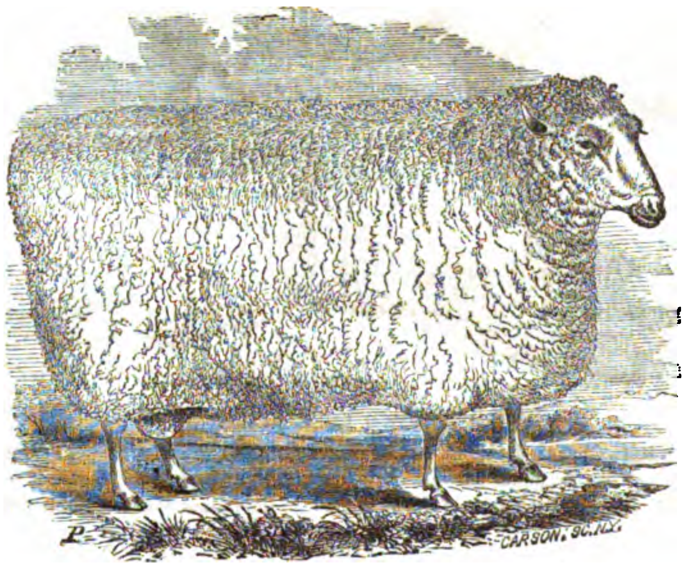
FAT SHEEP.

Best pen of 5 fat sheep, E. Driggs, Elyria, O	$15
2d best, J. Lenty, Gates' Mills, O	10
Best single fat sheep, R. N. Andrews, Rootstown, O	5
Best 5 fat lambs, E. Driggs, Elyria, O	10

AWARDING COMMITTEE—G. W. Penney, B. B. Browning and Chester Palmer.

SHROPSHIRE BUCK "LION,"

Bred by Lord Berwick, of Shrewsbury, England; imported by George Miller, of Markham, C. W.; and now owned by A. L. Chaffee, Jefferson, Ashtabula co., O. Now three years old; weight 334 pounds; sheared in spring of 1863 over 17 pounds of washed wool. Took First Premium at Ohio State Fair, at Cleveland, 1863.



COTSWOLD BUCK "DANDY,"

Bred by John Lane, of Cirencester, Gloucestershire, England; imported by George Miller, Markham, C. W.; and now owned by A. L. Chaffee, of Jefferson, Ashtabula co., O. Now three years old, weighed on first day of March, 1864, 381 pounds. Took First Premium at Ohio State Fair, at Cleveland, 1863.

There were 12 entries in the class of Cashmere Goats on which premiums were awarded as follows:

CASHMERE GOATS.

Best thoroughbred Billy-Goat, W. D. Smith, Hebron, O	$10
2d best, S. S. Williams, Granville, O	5
Best thoroughbred Nannie-Goat, S. S. Williams, Granville, O	5
2d best, W. D. Smith, Hebron, O	3

REPORT OF COMMITTEE.

We have examined the fine thoroughbred goats—both sexes—entered for competition, also the eleven grades—from 3-4 to 15-16 blooded—find the high grades very soft and fine samples, and almost equal to the full bloods. Think crosses of the pure Cashmeres on the common goat are to be desired, and that when bred with care they will form desirable acquisitions to the wool production of our State.

IRVING F. WILLIS,
W. N. CHAMBERLIN,
J. A. WRIGHT.

SWINE.

In the class of large breeds of Swine there were 26 entries. The following is a list of the awards, and the report of the committee:

LARGE BREEDS.

Best Boar, over 2 years old, A. Caton, Cardington, O	$15
Best Boar, over 1 year old, Geo. Anderson, Painesville, O	10
2d best, J. H. Perrine, Lebanon, O	5
Best Boar, under 1 year, J. H. Perrine, Lebanon, O	5
2d best, Martin Carroll, Painesville, O	3
Best Breeding Sow, over 2 years old, George Anderson, Painesville, O	15
2d best. J. H. Perrine, Lebanon, O	5
Best Breeding Sow, over 1 year old, George Anderson, Painesville, O	10
2d best, Wm. Probert, Cleveland, O	5
Best lot of pigs of the same litter, not less than five, Geo. Anderson, Painesville, O	5
2d best, M. Carroll, Painesville, O	3

REPORT OF COMMITTEE.

We, the undersigned committee, on examination found a very limited exhibition of large breeds; some entries without competition, especially large boars; one other difficulty was the want of purity of blood, with a few exceptions. We would call the attention of breeders and stock raisers to the above facts.

T. P. JOHNSTON,
T. G. SHIELDS,
WM. ALSDORF,
F. P. VERGON.

In the class of Small Breeds there were 12 entries. The following are the awards and the report of the committee:

SMALL BREEDS.

2d best Boar over two years old, A. P. Leland, Newburgh, Ohio	$ 5
Best Boar over one year, S. Toms, Elyria	10

Best breeding Sow over one year old, S. Toms, Elyria $10
2d best, C. Laroe, Warrensville, O 5

REPORT OF COMMITTEE.

The Committee respectfully report that they award premiums as per margin, and would add, that with the exception of animals shown by same, they find the exhibition of hogs in this class unworthy of the great State of Ohio.

W. F. Greer,
J. D. Easton,
J. V. D. Pettit.

In the class of Sweepstakes, there were 19 entries:

AWARDS ON SWEEPSTAKES.

Best boar of any breed, not over two years old, Geo. Anderson, Painesville........ $15
Best sow of any breed, not over two years old, A. G. Smith, Ford, O 15

Awarding Committee.—R. M. Kinney, Erastus Spencer, Geo. Lewis and I. C. Treat.

POULTRY.

There were 70 entries in the class of Poultry. Annexed is the report of the Committee and a list of the awards:

Your Committee selected to report on Class No. 21, beg leave to report that they have carefully examined the entries in their class, (which, by the way, was somewhat difficult on account of the arrangements having them scattered over too large a space), and would hereafter recommend the proper adjustment of the several entries, but having done the best they could under the circumstances, have awarded the premiums and recommendations as before stated.

Jos. Ralston,
O. Waters,
Brice Hitton,

AWARDS ON POULTRY.

Best pair of China fowls, Henry Bishop, Springfield $3
2d best, E. Bingham, Cleveland 2
Best pair of Game fowls, Wm. Mills, Orange 3
2d best, Moylan Fox, Cleveland 2
Best pair of Dorkings, E. T. Sturtevant, East Cleveland 3
2d best, E. S. Willard, Cleveland 2
Best pair of Polands, A. Hall, Cleveland 3
2d best, Michael Rahar, Cleveland 2
Best pair of Spanish, Wm. Beldin, Detroit, Mich 3
2d best, A. Hall, Cleveland 2
Best pair Turkeys, J. M. Tubbs, Cleveland 3
2d best, J. Huntington, Cleveland 2
Best and largest exhibition of Poultry, owned by one exhibiter, Henry Bishop, Springfield, O.. 5

SECOND DEPARTMENT

In the class of Machinery, Engines, &c., there were 23 entries. The following awards were made, viz.:

MACHINERY, ENGINES, ETC.

Best portable Farm Engine, C. & J. Cooper, Mt. Vernon $50
" Steam Guage, E. F. Healy, Cleveland 3

Best Shingle Machine, L. S. Fairchild, Cleveland		$5
" Moulding Machine, Andrew Parker, Cleveland		5
" Water Wheel, Jas. Leffel & Co., Springfield		5

AWARDING COMMITTEE.—John P. Holt, N. S. C. Perkins, Wm. Whitely and J. E. Owens.

In the "First Division" of Agricultural Machines, there were 50 entries. Annexed is a list of the awards and the Committee's report:

AGRICULTURAL MACHINES.

Best threshing machine, S. E. Oviatt, Richfield	$15
" sweep horse power, R. McLennan, Springfield	10
" endless chain horse-power, R. & M. Harder, Cobleskill, N. Y	10
" threshing machine operated by endless chain power, R. & M. Harder, Cobleskill, N. Y	5
" circular saw mill operated by horse-power, Baldwin, DeWitt & Co., Cleveland	5
" log cross-cut saw mill horse-power, White and Bostwick, Norwalk	5
" combined clover huller and cleaner, D. Whiting, Ashland	5
" hemp and flax dressing machine, F. A. Haven, New York	5
" cider mill and press, G. E. Hutchinson, Cleveland	5
" horse hay rake, Hawkins & Howe, Akron, O	3
" hay, straw and stalk cutter, Hawkins & Howe, Akron	5
" hay press, S. Colahan, Cleveland	5
" power corn sheller, Baldwin, DeWitt & Co., Cleveland	5
" hand corn sheller, A. Higley, Warren	2

Your Committee find many articles in this class worthy of a second premium, that we were unable to award, as there are no second premiums in this class. We, however, have recommended some articles for your approval.

D. W. H. HOWARD,
CHAS. CARPENTER,
E. C. DANIELS,
W. S. STETSON.

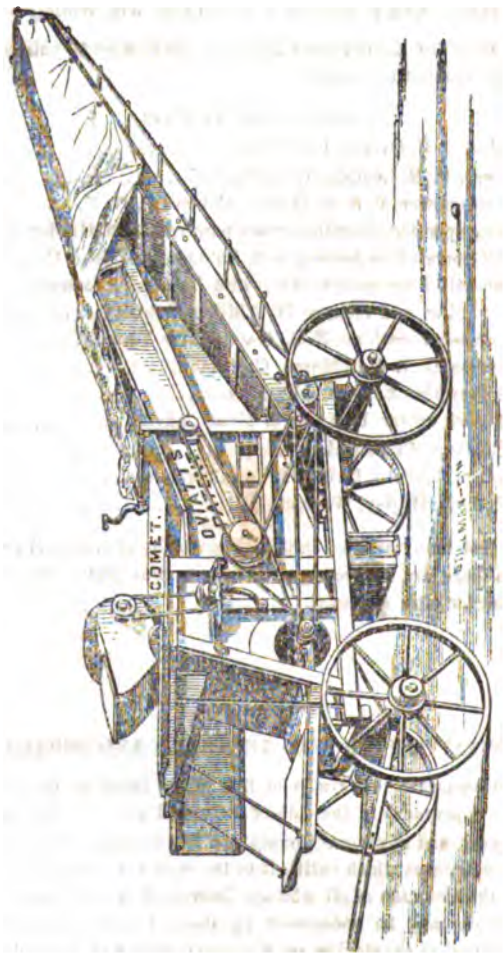
OVIATT'S IMPROVED THRESHER AND SEPARATOR.

This thresher and separator—the result of five years' labor on the part of the inventor—made its first public appearance in the fall of 1863, and received first premiums at the Ohio State Fair for that year, and at several County and District fairs where it was exhibited.

It has various new features which entitle it to the marks of distinction which it has received, and commend it to the attention of all who are interested in this class of implements. Some of these improvements may be understood by the aid of the cut, and a brief description. Standards for the support of the stacker are dispensed with, and their places supplied by cords leading from its upper end to a hand-crank shaft nearly over its base. The straw-carrier is driven from its lower end, and its driving belt has the same tension, whatever may be the elevation of the stacker. The stacker may be easily and quickly raised or lowered, while the machine is in operation, by turning the hand-crank A ratchet holds the shaft in any desired position. The stacker is jointed in the middle, and when about to be moved, the upper part is folded under the lower, and held there by hooks and staples. The cross-braces in the carrier, upon the stacker, keeps it in shape, and it is not easily displaced on the pulleys

The stacker is closely covered by a canvas or oil-cloth "hood," resting upon the cords, by which it is supported, and buttoned to its sides. Over the threshing cylinder is a drum, open towards the cylinder, in which is placed a rapidly revolving fan. An air-tight passage connects this drum with the opening over the sieves. By this simple arrangement the dust and chaff arising from the cylinder are drawn into the fan-drum, forced through the air passage, deprived

upon the sieves of any grain which may have been drawn in by the fan, and driven out and discharged with the straw at the end of the stacker. Thus is closed up a broad avenue through which so many workmen with threshers have been conducted to disease and death. There are



other advantages arising from this mode of construction. The blasts of air from the fans, shut in by the canvas tube, impel the straw along the carriers, and greatly aid in its discharge. It is unnecessary to change the position of the thresher as the wind veers, for the fan blasts are sufficient to carry out the straw against a head wind.

The shoe has an end shake, whereby the side rack or vibration of the machine is avoided and space is gained for the introduction of larger sieves than are commonly used with the same length of cylinder, so that the work of separating and cleaning the grain is more thoroughly performed. The grain and screening boxes are placed nearly under the center of the body of the machine, and the contents of each may be drawn off from either side at pleasure. The separator carrier is of novel construction, and is constantly discharging what falls through its meshes, so that it does not fill up and clog.

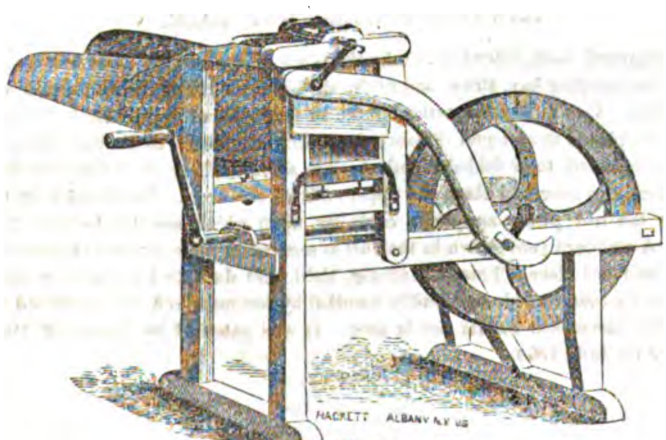
The feed tables are hinged to the machine, and are folded up in compact form when not in use. With all its attachments and advantages, it has a less number of pulleys, and requires

less belting than other thrashers, and will perform a given amount of work with less power than is commonly required. As a whole it is a light, compact machine; easily transported; quickly set up for work, or prepared for moving when its work is performed; does its work thoroughly, without waste of time, and conduces much to the comfort and health of its operators.

The inventor and patentee of this machine is S. E. Oviatt, of Richfield, Summit county, O.; and the thrasher, exhibited at the State Fair, was manufactured by Hawkins & Howe, of Akron.

STEEL-TOOTH HORSE-RAKE.

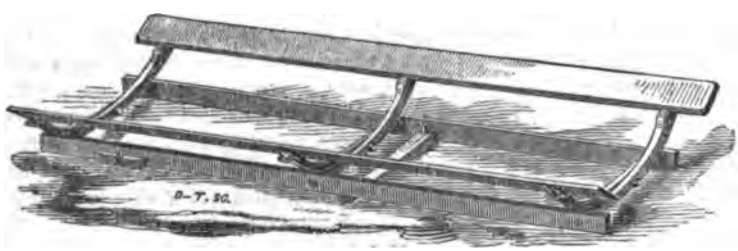
The horse-rake, to which the first premium was awarded at the Ohio State Fair in 1863, is also manufactured by Hawkins & Howe, at Akron, Ohio. The leading features of the rake may be observed in the cut. The teeth are made of spring-steel and are hinged upon a rod, above the axle, in such a manner as to allow each tooth to raise and fall independent of every other. The points of the teeth are turned up so as to slide over the ground, and not tear it, as a harrow. The teeth can adjust themselves to the inequalities of the ground, and neither tear up the sod upon the hummocks, nor leave a part of their work unperformed. The hay and grain gathered by it are as free from dust and dirt as if the work had been done by hand. The teeth are made long, and shaped to carry the hay instead of rolling it over the ground. In operating the rake, when a stone or stub is struck by a tooth, the tooth raises, and straightens sufficiently to pass over it, and immediately springs back into place. Cleaner fingers are so attached that when the teeth are raised the fingers move downward and clear the hay from the teeth. The teeth are raised by a lever placed at the right hand of the operator. A boy or girl, twelve years of age, can operate the rake; and on very many farms the owners could pay for a rake of this description, out of what they might save by its use, in a single season.



THE BUCKEYE FEED-CUTTER.

This new feed-cutter, to which the first premium was awarded at the Ohio State Fair in 1863,

was patented by Horace R. Hawkins, Nov. 20th, 1860, and Aug. 27th, 1861; and is manufactured by Hawkins & Howe, Akron, Ohio. This feed-cutter has a single, plain, straight knife, attached to a crooked knife lever, one end of which is connected with the driving wheel, and the other is supported by a right-angled rocking shaft, placed nearly over the center of the mouth of the cutter-box. Three strokes are made at each revolution of the hand-crank. The stroke of the knife is wholly made while the driving wheel is performing one-third of a revolution; and that part of the revolution is used, which the force of gravitation would cause the wheel to pass through, were it placed at rest with the knife commencing to cut. The knife makes its cut with both a shearing and a drawing stroke. A strong pressure is exerted upon the knife, in the latter part of the stroke, through the lower part of the right-angled shaft, as it is brought to a perpendicular with the line of draft. The horizontal part of the right-angled shaft, which supports one end of the knife lever, is placed between two pivots, or hook-bolts, by means of which the knife can be adjusted to and from the mouth of the box. The cutter-box, for convenience, is made in two parts, one of which is removable at pleasure. The other part, faced with hardened steel, rests upon set bolts, by means of which the box can be raised—the knife remaining stationary—to compensate for the wear of the knife. The heavy driving wheel is hung low, and the feed-cutter is kept in position by two screw bolts passing through the foot-pieces, so that the knife may be driven rapidly without injury. This feed-cutter is strong and durable, not likely to get out of repair, and is adapted to the cutting of all kinds of feed. Hand, power and combined (hand or power) feed-cutters, as described, are made by the manufacturers above named.



HAWKINS' FOLDING HAY RACK.

This is an improved Rack, intended to take the place of the box on carts and wagons when they are used for carrying hay, straw, and unthreshed grain. It has two bed pieces, which rest upon the bolsters. Into these are morticed three or four pair of arms. Each pair are so connected by a bolt, placed at an equal distance from the bed pieces, as to allow them, when the side boards are removed, to be folded together. The side boards are held firmly in their places by staples, which slip over and clasp the upper ends of the arms. Two staples, driven in the under side of the bed pieces, support a cross-bar, upon which, and the bolsters, the bottom boards rest. A standard (not shown in the cut) is secured in place by two staples in the forward end of each bed piece. This is a strong, light, and durable hay rack; holds its load securely; is easily constructed, and readily handled by one man, and can be stored away in a small space when the season for its use is over. It was patented by Horace R. Hawkins, of Akron, Ohio, July 10th, 1860.

HUTCHINSON'S FAMILY WINE AND CIDER MILL, WITH PRESS COMBINED.

The machine combined, except the curb, is made wholly of iron. The parts that come in contact with the fruit and juice are prepared by a patent process, so that they will not affect it. The rest is handsomely painted and varnished. It occupies less than two feet square space on the floor, weighs less than one hundred and sixty pounds, easily handled and worked by one man. For simplicity, compactness, strength, economy of power, and quality of work, challenges comparison. It is at once the machine so greatly needed, and should be owned by every farmer, gardener, fruit-grower, and in fact every family that may have apples for cider, grapes, currants, berries, or other fruits or plants for wines, jellies, etc.; for pressing lard, wool for packing, etc., etc. It forms also an excellent and convenient cheese press. It should be found in the hands of every family of small means; is indispensable with the true economist; a rare novelty with the man of wealth, who is only independent with it.

A large number of the mills have been sold, all of which, without an exception, give perfect satisfaction.

The mill and press complete, and adapted to all the purposes stated, costs but eighteen dollars, delivered at place of manufacture.

HIGLEY'S CHAMPION CORN SHELLER.

This machine is for power or hand; turns easy, shells fast and perfectly clean; separates the corn and cob, taking but one man to operate the hand sheller.

It is very simple in its construction; is durable, and not liable to get out of order.

WESTERN EMPIRE SEPARATOR AND GENERAL SEED CLEANER.

PATENTED DEC. 3, 1861, BY A. HIGLEY.

Manufactured by W. H. Hull & Co., Warren, O.

This machine cleans and separates all kinds of grain and seeds that vary either in size, shape or weight; will clean flaxseed to perfection—making it into one or two qualities, as desired; No. 1 being perfect for seed. Taking a compound of wheat, oats, cockle, chess, grass-seed, straw, sticks, etc., once passing through the mill cleans and separates all the

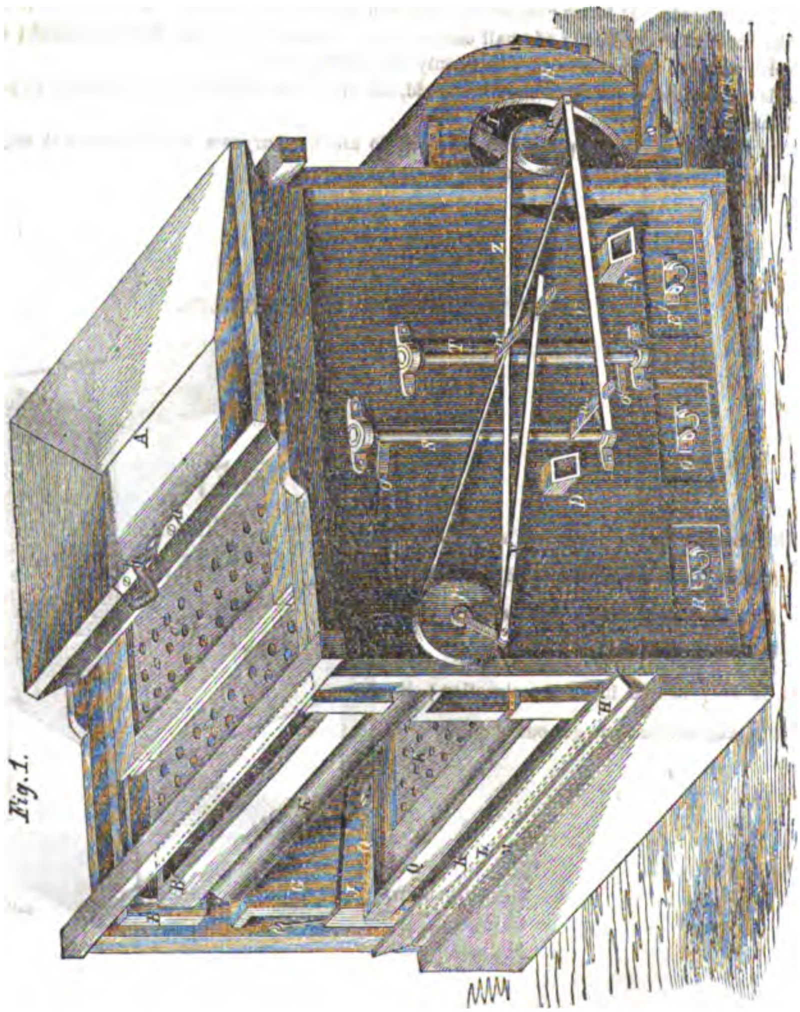


Fig. 1.

different kinds—each one passing out by itself, and at the same time making the wheat into one, two, or three qualities, as desired—No. 1 being perfectly clean; it also cleans all rye from number one wheat, making it pure for seed.

This machine is simple in its construction; is not liable to get out of order; is durable; runs easy, and cleans very fast.

HIGLEY'S CORN SEPARATOR.

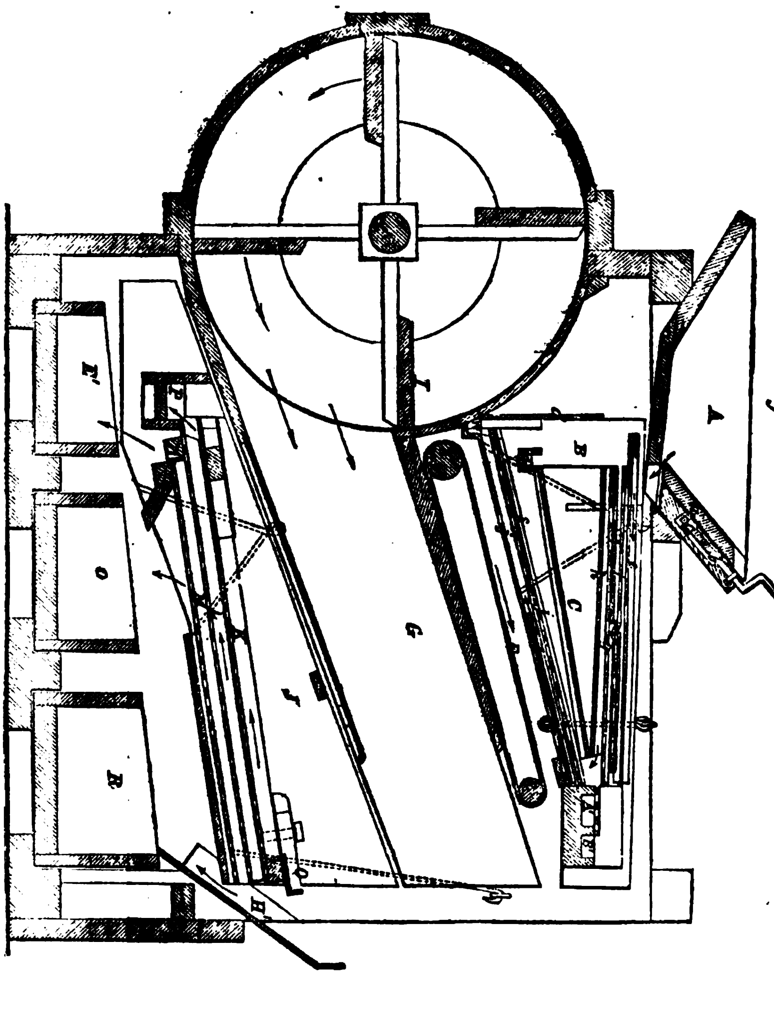


Fig. 2

HAND PRESS.

This is an article the public has long been in quest of, and one to meet the necessary requirements has never been invented until the discovery of this, the celebrated "Union Power Press," which is an entirely original invention, combining three great powers in mechanics, most happily and advantageously arranged.

The same number of hands that are necessarily employed to handle the commodity to be pressed, apply the power, and will press a bale with great rapidity.

This press can be placed and worked in a very small space, and is also conveniently worked in store rooms for packing wool, tobacco, rags, etc.

Bales can always be made at one pressing, in as compact a form as may be desired, thus saving all necessity of a compress.

In the Second Division there were 67 entries, to which the following awards were made:

Best wheat-drill (2-horse), Smith, Barnes & Co., Tiffin	$10
2d best, Baldwin, Dewitt & Co., Cleveland	5
Best combined clover-thresher and huller, John C. Birdsall, West Henrietta, N. Y.	5
Best grain or grass broadcast sowing machine, A. Ingals, Independence, Iowa	5
Best self-raking reaping machine, Pritz & Kuhns, Dayton	5
Best mowing machine, Baldwin, Dewitt & Co	5
Best combined reaper and mower, C. Aultman & Co., Canton, Ohio	5
Best display of reaping and mowing machine knives, Whitman & Mills, Fitchburg, Mass	5
Best hay pitching machine, C. Rundall, Cleveland	3
Best corn planter (horse power), J. F. Pond, Cleveland	5
Best corn planter (hand power), Francis Vandoren, Adrian, Michigan	2
Best potato digger, G. H. Kidney, Cleveland	5
Best corn cultivator, E. Briggs, Medina	2
Best horse hoe, H. B. Hammon, Bristolville	2
Best double shovel plow, Rice, French & Co., Springfield, Ohio	2

AWARDING COMMITTEE—U. C. Deardorff, Chas. Smith, Chas. Phillis.

DIRECTIONS FOR USING THE "BUCKEYE" MOWER AND REAPER.

1st.—Put in the pole.

2d.—Place the lever on pin at the side of machine, hooking the chain from the wrought coupling-bar to the lever.

3d.—Attach the cast-steel finger-bar to wrought joint, by the pin in the tool-box. Be careful to tighten the set-screw in the coupling-bar, which keeps the pin in its place. Examine the set-screw at the other end of coupling-bar, and see that it is screwed up tight.

4th.—Fasten the wrought brace attached to the coupling bar, to the front part of the shoe by a pin in tool-box. Be careful to put in split key and spread the ends, to prevent its losing. Put in both bolts at the other end of the brace, and screw them up very tight.

5th.—Slide the knife in the guards.

6th.—Attach the connecting rod to the crank. In doing this be very careful to notice how you take off the nuts, and the strap between them, so you can put them on the same way again Move the two half boxes apart, far enough to go on to the wrist; tighten up the two first nuts

till the half boxes become tight on the strips of leather, observing that the wrist has sufficient play, so as not to heat. Put on the iron strap, then put on the outer nuts very tightly. Enter the connecting rod into the eye of knife, putting spring key in same; should this spring key get lost at any time, a piece of leather or wood will answer a good purpose.

7th.—Bolt track-clearer to outer shoe; put cast-iron plug (of which there are two in tool-box) between the shoe and track-clearer, with the thick end downward, to keep the track-clearer from sliding on the ground.

8th.—Examine all the nuts and see that they are tight.

9th.—Oil with good sperm, or No. 1 lard oil, all the parts where there is any friction, and you are ready to mow.

10th.—To fold the bar over the frame for transportation, throw the pawls out of gear, place the wrist to which the connecting rod is attached that drives the knives, down or at the lower side. Take plug out of outer shoe. Take hold of the shoe and lean the bar against the frame. Take the lever in one hand and track-clearer in the other, bear down on the lever and you will lay the bar over on frame, with but little exertion. Put the flat key between the shoe and track-clearer, which will keep the track-clearer off the drive wheel.

11th.—To unfold the bar, push the knife as far in the guards as it will go; set the lever up straight; let the bar slide down on the ground; take hold of shoe and ease it down. A little practice will enable you to fold and unfold with ease.

12th.—One knife should not be used longer than half a day, without grinding. The knives can be ground on a common stone. Be careful to keep the same bevel on the knives.

13th.—The bearings must be kept well oiled. The crank bearings, connecting rod and shoe, should be oiled often. If your machine draws hard you may be sure that it wants oiling, or the knives are dull.

14th.—To make good, clean work, drive out at the corners, raise the bar as you drive out, and drop as you enter. Never commence a swath without having the guards clear from cut grass.

Keep the knives sharp, and bearings well oiled.

DIRECTIONS FOR REAPING ATTACHMENT.

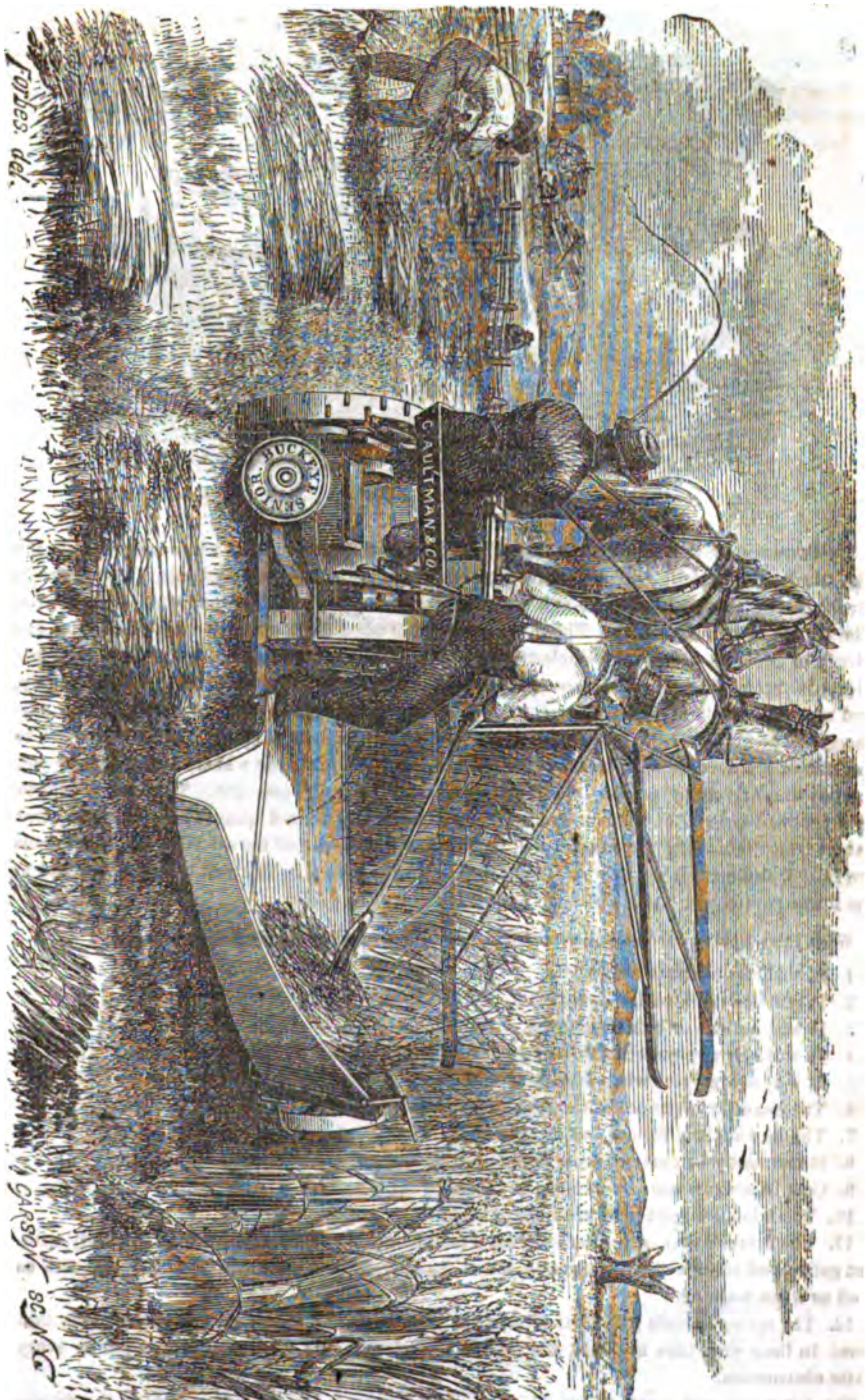
1st.—Uncouple the mower bar at hinge joint. Take off front brace of coupling-bar. Take off lever and fulcrum, and in same place put reel arm stand. Hang up the main coupling-bar by the longest screw cut bolt.

2d.—Slip the sickle-knife in the guards. Have the platform in a suitable place, so you can back the machine up to it. Couple the bar with the same pin as you do the mower, then arrange the back coupling. Hang it up same as in front. Put on the reel, and be careful to have it a suitable height for the grain you want to cut: lengthen and shorten the reel chain with the short pieces.

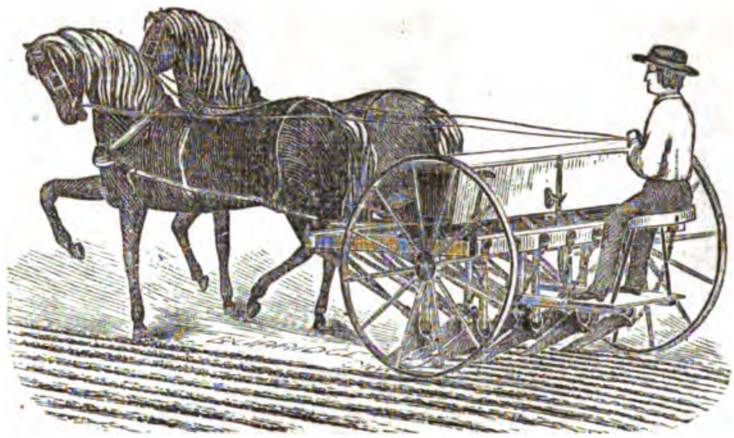
3d.—In reaping, move your seat to the left, as you see holes bored for that purpose. Throw the wheel that is next the grain out of gear. Any common three-pronged fork will answer to throw off the grain.

4th.—Should the machine fail to operate as warranted, you will immediately notify us or our agent, so that we may have an opportunity of removing the difficulty. By little thought, you will at once see that the success of your machine depends on the strict observance of the above rules, and should you fail to observe them you forfeit your warranty.

C. AULTMAN & CO.



"BUCKEYE" MOWER AND REAPER.



SMITH BARNES & CO.'S GRAIN DRILL.

Description of the Drill.—The wheels are high, with broad rims; the axle extends the full width of the drill and works in composition boxes. The box is large. The frame is strong, being thoroughly braced and put together with joint bolts and not with wooden pins. The tongue is stiff and long. The double-tree is attached back of both cross-pieces, and has plenty of room to vibrate, the single-trees being attached to rods extending through the frame pieces in front. The drag bars are our patent double-braced bars, very strong but not heavy, and are attached to the shovels in t[illegible]ner, or by springs, at the option of the purchaser. The points of the shovels are sharp and made broad, to give both depth and width to the row of grain. The agitators are made substantial, and run upon a shaft extending through the box and driven by gearing, thoroughly protected from dirt and grit. The feed is gauged by a screw at the end of the box and can be set to sow any desired quantity to the acre. Our patent transverse slides are so arranged, that they entirely shut off the sowing when the shovels are raised, and start it again when they are let into the ground. The seat is firmly attached to the lower part of the frame and is an easy position for the driver.

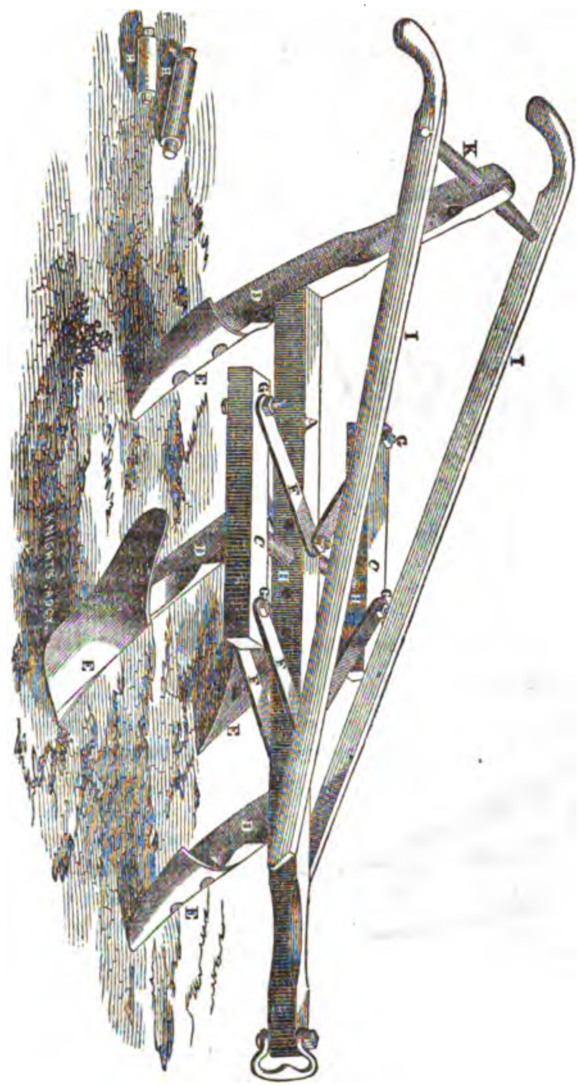
With this explanation we will proceed to give some of the advantages of this drill:

1. It will sow all kinds of grain.
2. It will sow all kinds of grass seed.
3. It will not cut or break the grain.
4. It will sow any quantity to the acre, from 1 to 5 bushels.
5. It will sow correct when driving fast or slow.
6. The quantity is gauged without any change of gear.
7. The feed shaft is thrown out of gear in an instant.
8. It can easily be changed from double to single rank.
9. Can, in sowing, use any number of tubes required.
10. There is no weight upon the horse's neck.
11. The driver's seat is so attached that a man can ride and operate his drill perfectly without getting off to turn about, raise and lower the shovels, and see the operation of his drill as well as when walking.
12. The spring shovels will clear themselves from roots and stones or any obstructions that come in their way, thus avoiding the necessity of stopping to replace a broken pin at every little obstruction.

The foregoing, and many others which might be named, are advantages which the farmer should consider.

BRIGGS, IMPROVED CULTIVATOR.

This invention consists in a device exceedingly simple in arrangement and construction, by which cultivator shovels may be changed in position so as to work different distances from the main beam and be reversed at pleasure. In the above illustration the cultivator is arranged for hilling up, and by loosening the bolts G, passing through the joints F, you can adjust the

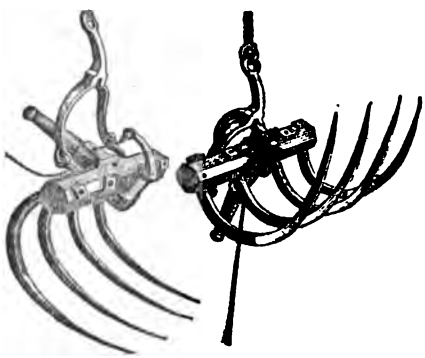


width by moving the side beams either backwards or forwards, making it as narrow as a shovel plow, or wide enough to cultivate corn, hilling it up by going once in a row each way; the side beams are kept in position by the use of different rollers (H) placed between the beams. When adjusted and the bolts G turned down tight, it is as firm as any cultivator that is not adjustible. The side shovels retain their parallel position at whatever distance they may be

placed from the main beam. By removing the four outside bolts G, the side beams, post and shovels may be changed to opposite sides of the main beam, to work corn when it is small, without hilling it up; the outside shovel will then turn a furrow away from the hill, and the middle shovel will turn it back pulverized, and the weeds destroyed. Thus making a cultivator that can be so arranged as to do all the work in the different stages of the crop; doing the work of the fine-toothed cultivator in small corn, and the double shovel or three shovel in large corn, and the shovel plow among potatoes; and doing more than the two latter, as this cultivator can do all the work by going once in a row each way, saving one-half of the time and adding but little to the draft.

Manufactured by E. Briggs, Medina, Ohio.

L. RUNDELL'S HORSE PITCHFORK.



This is the simplest and most complete working hay-fork yet introduced to the farmer. Its simplicity and compactness render it more substantial than the complicated arrangements heretofore used for this purpose. It requires less room for operating, and can be worked with greater facility in all places.

Manufactured by R. J. S. Rundell & Bro., Chicago, Ill.

HAMMON'S HORSE HOE AND CULTIVATOR,

Patened April 10, 1860, as adapted to corn, tobacco, cotton, nursery cultivations, and hilled crops generally.

The side teeth are of mould-board form, which gives great cutting surface, thus stirring much soil. The front tooth is diamond shape, when one point wears off the other is turned down, getting double wear. The side teeth are readily set to turn the soil from or to the crop, by the use of the grooved plate, "shown on an enlarged scale at 3." This plate is used on the underside of the short beam, in connection with the standard at 1. And by the use of the grooved plate, the teeth are set to plow more or less soil to the plant, as the case requires.

In the third division there were 48 entries. The committee made no report, but the following are the awards:

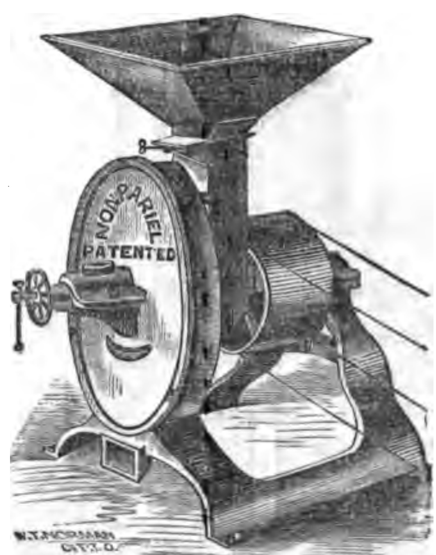
Best portable flouring mill, Jos. Sedgebeer, Painesville	$10
Best portable grist mill, Jos. Sedgebeer, Painesville	5
Best smut machine, A. J. Vandegrift	5

Best farm feed mill, Jos. Sedgebeer, Painesville $5
Best fanning mill, Aaron Higly, Warren.. 8
Best hominy mill, Wright & Holman, Springfield.. —
Best self-regulating wind-mill, W. B. Wadsworth, Cleveland 5
Best stock scale for general purpose, E. & T. Fairbanks & Co., St. Johnsville, Vt........... 10
Best platform scales do do do do 5
Best stump extractor, D. C. Smith, Adrian, Mich..com
Best brick machine, J. W. Penfield, Willoughby.. 10
Best drain tile machine, J. W. Penfield, Willoughby 5
Best farm gate, Wm. C. Herder, Miami.. 3
Best grindstone, Chas. W. Searns, Cleveland.. 2
Best bee hive, Flanders & Field, Shelby, Ohio.. 3
Best refrigerator, Baker & Keith, Walpool, Ind.. 2
Best portable fence, Reuben Haynes, Oberlin.. 3

Awarding Committee.—N. G. Harrington, J. C. Danks, David Kenfield, Albert Van Gorder.

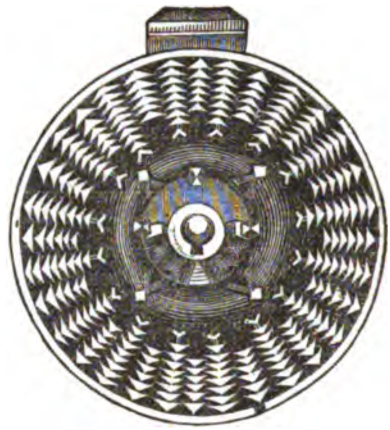
CHAMPION NONPAREIL MILLS,

For grinding corn meal, corn cob and shuck, oats, mixed feed, spices, malt, bones, &c.

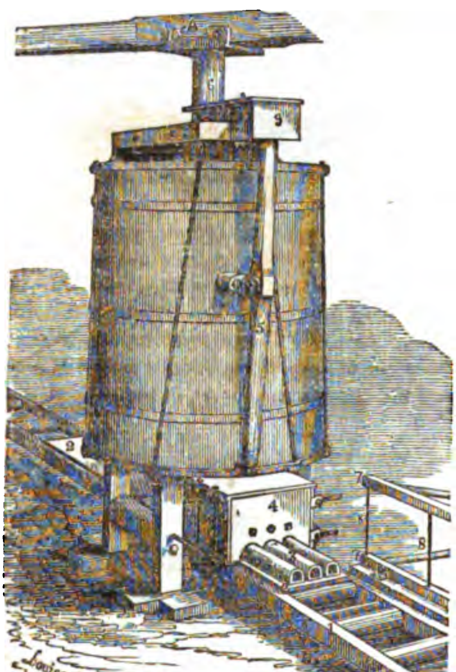


The Nonpareil Mill for general grinding purposes—both for the farmer and mechanic—for grinding, crushing, and pulverizing purposes, being a powerful, durable, and simple mill, and not liable to get out of repair; enabling the farmer to do all his meal and feed grinding at home, thereby saving both time and toll in going to mill. This mill possesses some new and valuable features not found in any other. The teeth are Y shape, and so constructed that each tooth, as it pulverizes, forces the meal or other substances, towards the periphery and discharging edges, and does not depend upon the centrifugal force at all. The corn and cob crusher being separate from the grinding plates, is more substantial, durable, and effective; requiring less power than when cast on the plate; it also operates twice at each revolution. The journals have regular caps, and are on each side of the driving pully, the lower end, or supporting part, being cast, with the frame of the mill, in one entire piece, giving it great strength and durability; it is not liable to choke, runs in either direction, and can be instantly changed from grinding fine corn meal to cob and corn. The Nonpareil is adapted for fine grinding as well as for feed.

Running Plate, driven by a shoulder and bolt in the spindle, removable at pleasure, runs either way, and self sharpening.



We present a cut and a short description of MATTICE & PENFIELD'S DRAIN TILE MACHINE.



This machine not only grinds the clay, and molds the tile, but places them upon the drying boards. 4, represents the die; 3, the tile; and 2, the drying boards, which are cut the length of three tiles, and placed upon the carriage, 1, the portion of which, under the machine, is covered with an endless belt, upon which these boards are placed, on the rear of the carriage, and are drawn under by the tiles as they issue from the die, and deposit themselves upon the boards. 7, 7, is a frame held together by the handles, across which small wires are stretched; 8, 8, for the purpose of cutting the tiles. This frame is movable, for the purpose of cutting the tiles where the end of the board occurs. 6 is the shaft which passes through the machine, upon which iron knives are fastened to grind the clay. To the lower ends eccentrics are fastened, that move the plunger in the clay box, to which the die, 4, is fastened. 5, is the lever by which the cut-off plate is driven over the clay box, after it is filled, to prevent the clay from pushing back up in the machine when the plunger pushes it out. 9, is the yoke upon which the slide is fastened, driven by an eccentric on the shaft that moves the lever, the plunger throwing it back when making the plunge, where it remains, leaving the cavity open again. A, is the sweep. The machine makes a plunge at every turn of the shaft. Less than one-fourth of the time required to make a turn of the shaft, makes a plunge, which gives the man that cuts them ample time to do so, and set them in drying racks, which are placed upon the hand barrows for the purpose of moving them when dried to the kiln.

SEDGEBEER'S IMPROVED CONICAL FRENCH BURR STONE MILL.

For flour, corn, and feed, by horse or any other power.

FIG. 1.

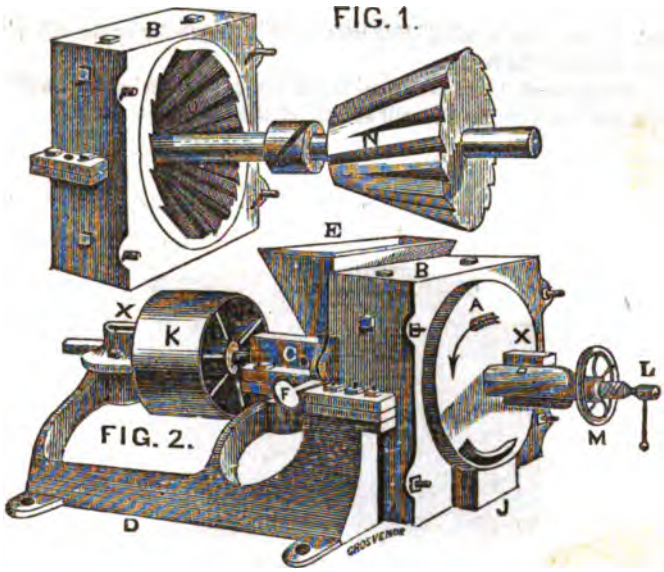


FIG. 2.

Description.—The grinding surface of the Conical Burr Mill is made of the best imported French Burr stone, conical in shape, the bed stone being formed out of solid cubical block, secured in a square cast-iron case, in the center of which Burr blocks the concave grinding surface is formed, as above represented, in Fig. 1, at B and O. The running stone-stone, or cone, is one solid block of burr stone, securely fastened on the mill spindle, as above represented in Fig. N. Both the running and concave stones are fitted to each other, and then ground in together, which forms the grinding surface; into which furrows are cut at regular intervals, to facilitate the discharge of the flour or meal; the whole being firmly fastened on an iron frame as above represented in Fig. 2, having no joints or wood in the entire frame, which establishes a solidity and durability beyond any other portable mill known. The stones are dressed in perfect order for immediate use, to be worked with a belt as wide as the mill pully, drawn from any kind of power sufficient to give the necessary motion to the mill, as designated below.

A—Represents the head plate, secured with four nut bolts to the iron cubically shaped case holding the stones.

B—The iron cubical case containing the concave, or bed of stone, secured to the iron frame D, with bolts on each side.

C—The hopper bed with thumb screw, enclosing the revolving feeder, which bed must not be unscrewed from the mill.

D—The cast iron frame of the entire mill made in one entire piece without joints.

E—The grain hopper to be enlarged with wood as required, and removable at pleasure.

F—The thumb screw which regulates the feed by forcing the swing valve against or near the revolving feeder,

J—The mouth or discharging aperture of the mill.

K—Pully to run as indicated by the arrow on the head plate, driven from a drum from nine to fifteen feet distant.

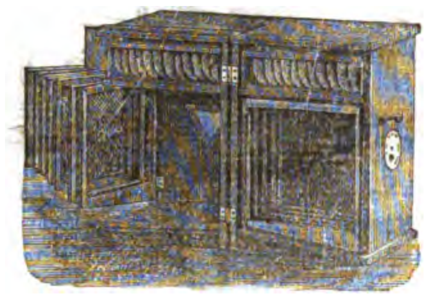
L—The regulating set screw, "left handed thread," for grinding fine or coarse, having a counter sink in the end towards the mill, that holds a thick piece of leather which receives the pressure of the spindle when grinding, and holds it to its place.

M—The jam nut, or wheel, for holding the regulating set screw to its place when set as required.

N—A detached view of the running stone with the revolving feeder on the mill spindle, showing the feeding groove in the feeder.

O—View of the inside of the concave stone in the iron case, detached from mill frame.

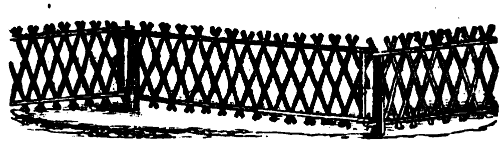
XXX 3—Journal bearings for the mill spindle of the running stone.



BOOK BEE-HIVE.

The above cut represents W. A. Flanders' Patent Movable Comb Bee-Hive. It is upon a modified plan of the celebrated Huber Hive, the frames opening like a book, with surplus honey boxes above. In swarming, this hive is divided by uplifting one-half and replacing it with an empty part.

HAYNES' PATENT PORTABLE BRACE FENCE.



Patented April 7, 1863.

Description.—This fence is constructed of pannels made in part by means of braces interlaced diagonally, which pannels are so united together at the ends, that the fence may be thrown into a zigzag position, which insures great firmness without the posts entering the ground, and also provides for opening the fence at any desired point for the passage of a team, in a manner similar to the opening of a gate. The braces are made about four feet four inches long, two inches wide, and full three-eighths of an inch thick; and are nailed to top and bottom rails, made of stuff about one and one-fourth inch thick, and about three and one-half inches wide, one of which rails is inserted in the standard, and both are nailed to the post inserted between them at the other end.

EXPENSE OF MATERIALS.—When lumber is worth ten dollars per thousand, the cost of lumber and nails for one rod of fence complete will not exceed thirty-eight cents. The pannels can be made by any farmer at a rapid rate, with the help of a bench frame.

The advantages of this fence over all others:

1st. It is very strong; wind cannot blow it over if properly set up and anchored to the ground at the corners with a small wooden hook.

2d. It is very light—a team can haul enough at a load for thirty rods of fence.

3d. It is rapidly put up, and as readily opened at any desired point as a gate.

4th. The cost of building and materials, as stated above, make it the most desirable fence in use.

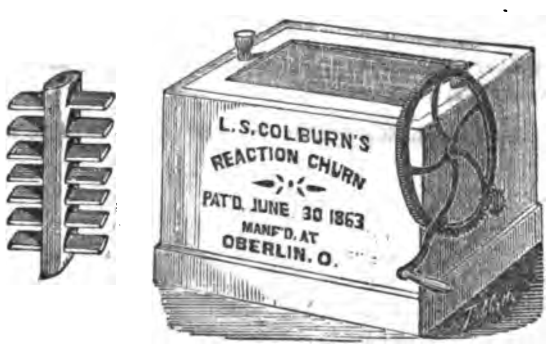
In the class of Tools and Household Implements there were 58 entries, with the following awards:

TOOLS AND HOUSEHOLD IMPLEMENTS.

Best farm road scraper, Baldwin, Dewitt & Co., Cleveland	$1
" cheese vat with heater attached, Roe & Blair, Madison, O	5
" churn, L. S. Colburn, Oberlin	3
" butter worker, Richardson & Keeler, Sherman, N. Y	1
" washing machine, J. F. Pond, Cleveland	3
" clothes wringer, Putnam Manufacturing Company, Cleveland	3
" mangle or ironing machine, Thos. Farnesworth, Cleveland	2
" clothes horse to occupy the least space, John Danner, Canton	2
" well pump, E. Rhodes, Sr., Clyde	3
" apparatus for raising water, Hutton & Co, Cleveland	2
" and most numerous collection of agricultural implements and machinery manufactured in Ohio, price and utility to be considered, Baldwin, Dewitt & Co., Cleveland	25

AWARDING COMMITTEE.—A. T. Barnes, R. R. Donnelly, and B. W. Coutant.

L. S. COLBURN'S REACTION CHURN.



ADVANTAGES CLAIMED.

The following are some of the most desirable advantages claimed for the Reaction Churn over others in use by those who have given them a trial for the past six months:

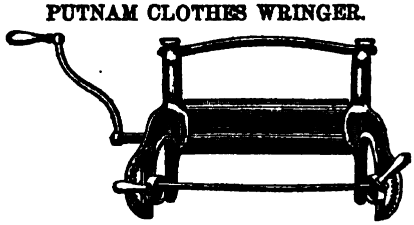
1. Simplicity, Cheapness, Durability and Perfection combined.
2. The ease with which they are operated, managed and cleaned.
3. That they get more butter, of a better quality, and with much less labor than with any other churn they ever used.

My invention consists in the combination, of a churn-box and gear wheel, with a broad horizontal shaft and dashers; the dashers passing through the shaft obliquely; and also in peculiar counter-beaters in the lower part of the box.

The object of my invention is to improve the efficiency of box churns, by giving the cream both a rotary and a longitudinal motion, and at the same time to force a sufficient amount of cool air through the cream to prevent its becoming heated by friction or agitation. The advantages of the diagonal dashers and broad shaft are as follows: A complete reaction is produced in the cream by the dashers at each half revolution of the shaft, and the shaft being flat and broad, the cream in the centre of the churn is agitated equally with the rest. Although this churn is extremely simple in its construction, yet by its peculiar reaction on the cream, I am enabled to churn in from three-quarters of a minute to three minutes, and make as much and as good butter as any churn in use.

L. S. COLBURN,
Manufacturer and patentee, Oberlin, Ohio.

PUTNAM CLOTHES WRINGER.



The Rolls, being of Vulcanized Rubber, will bear hot and cold water, and will neither break nor tear off buttons.

Our improved method of fastening the Rubber to the shaft, secured to us by letters patent, we believe to be superior to any other.

The frame being of iron, thoroughly galvanized, all danger from rust is removed, and the liability to shrink, swell, split, &c., so unavoidable in wooden machines, is prevented.

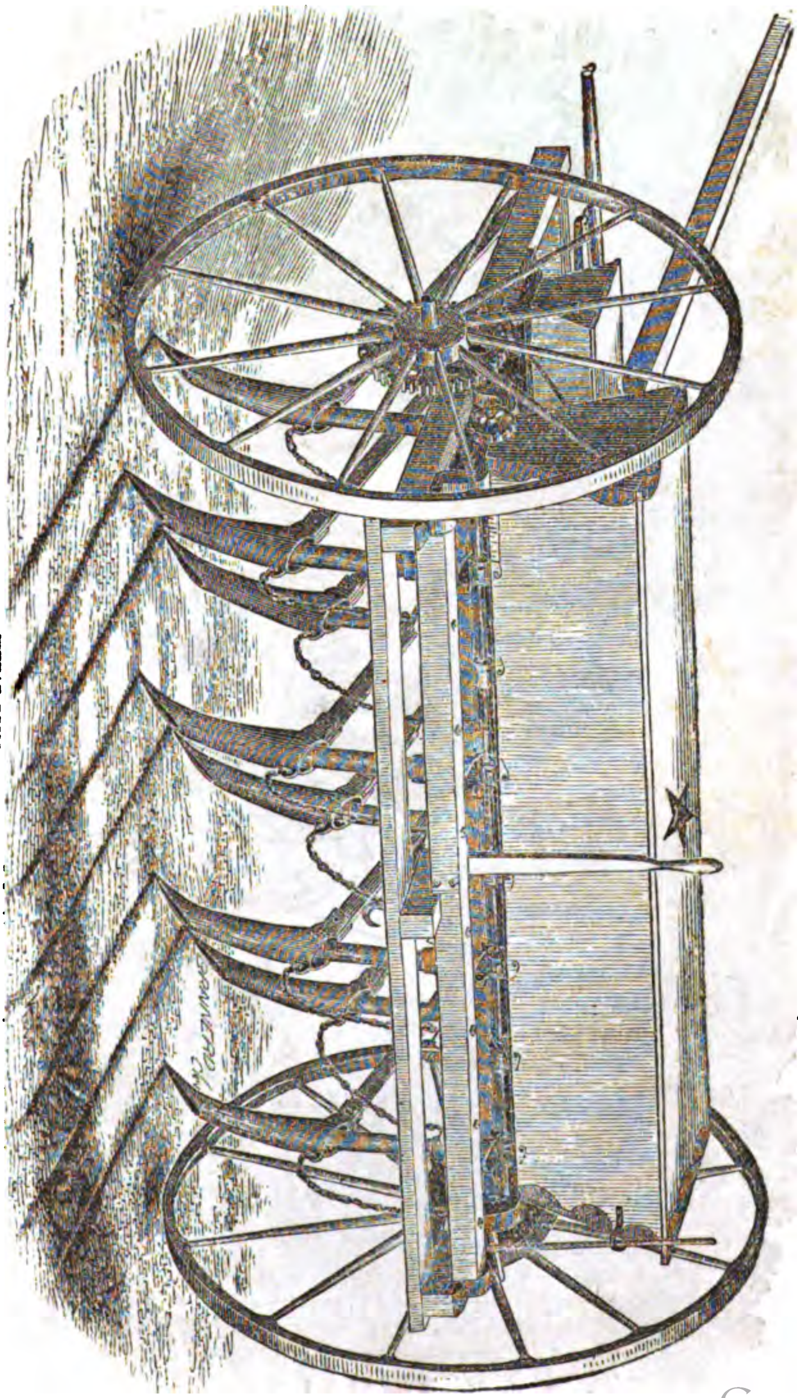
The spiral springs over the rolls render this machine self adjusting, so that small and large articles, as well as articles uneven in thickness, are certain to receive uniform pressure.

The patent fastening, by which the machine is tightened to the tub, we believe to be superior in simplicity and efficiency, to anything yet offered.

It will wring thoroughly anything, from a single thread to a bed quilt, without any alteration whatever.

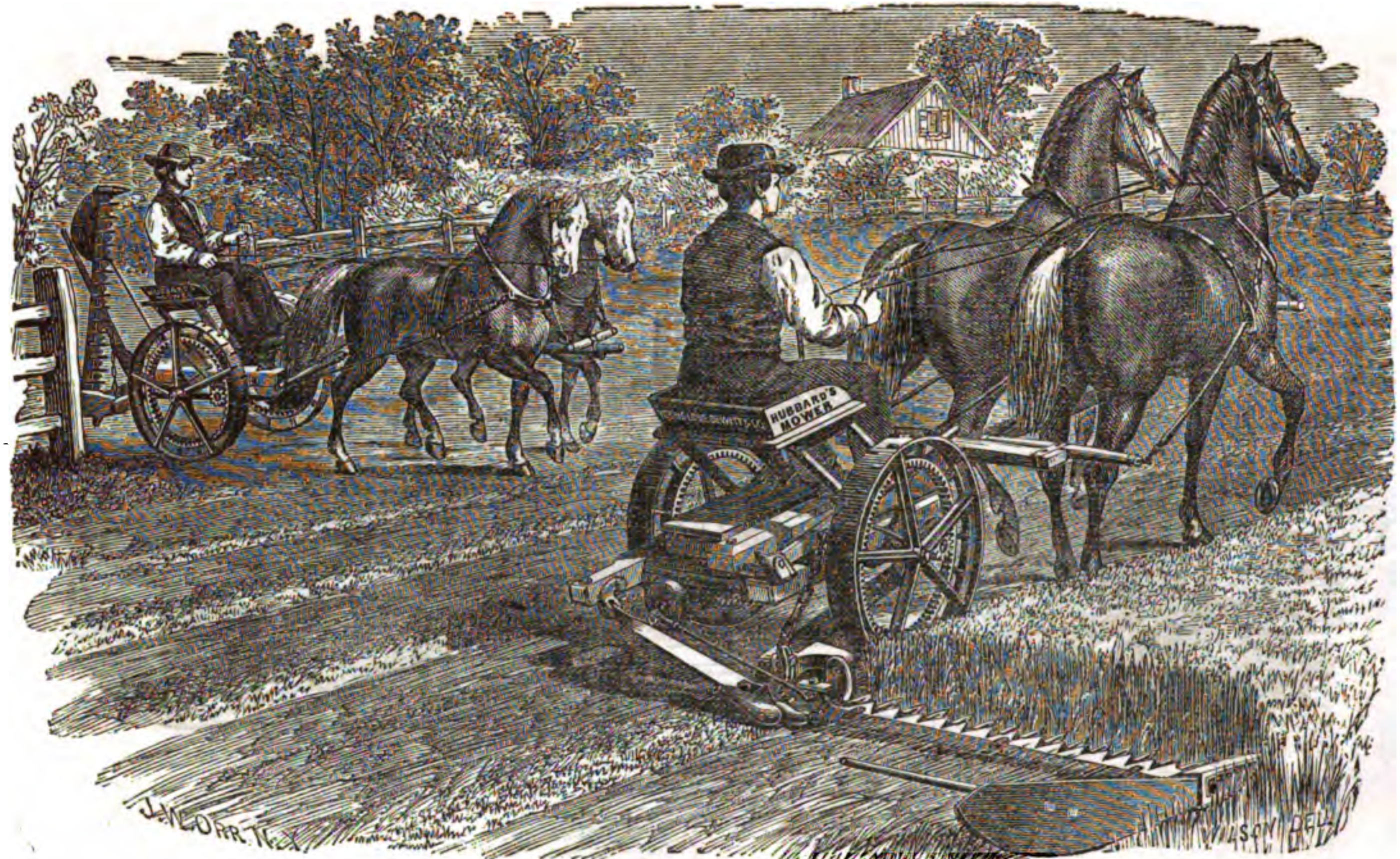
No thumb-screws or complicated fastenings to wear out or get out of order; it can be fastened firmly to the tub in a single second.

Among the collection exhibited by Baldwin, Dewitt & Co., were the following machines:

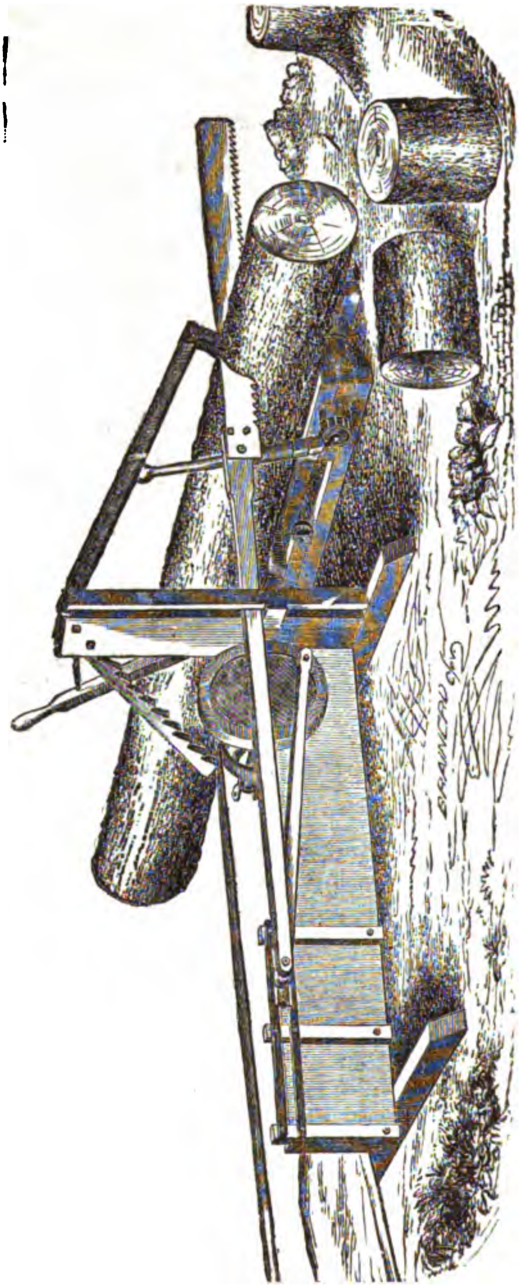


WHEAT DRILL.

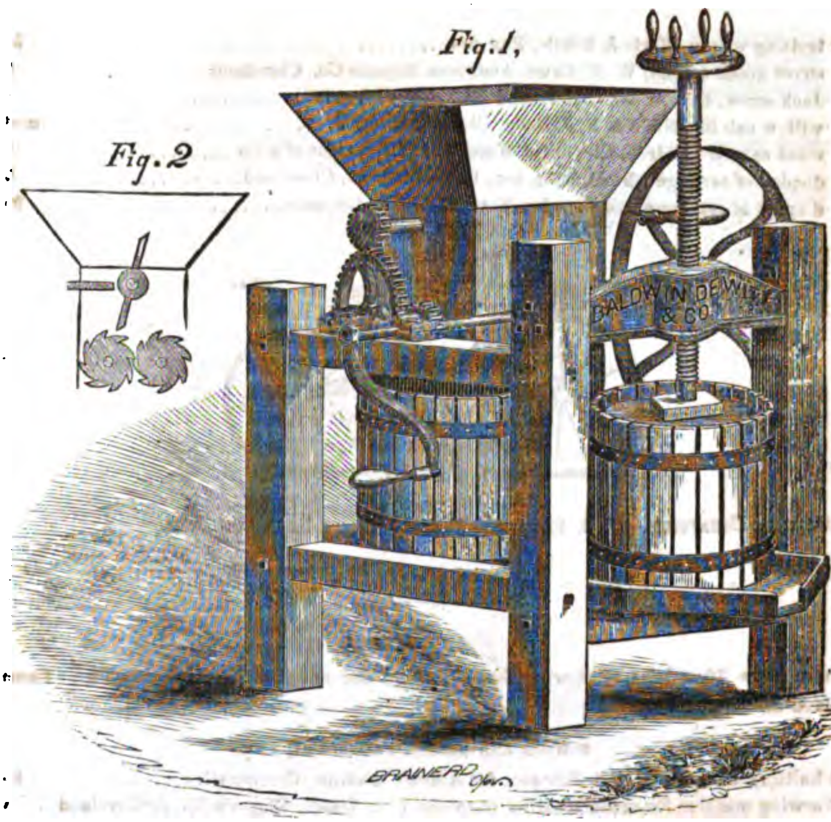
HUBBARD'S MOWER PASSING AN OBSTACLE.



MOVING FROM FIELD TO FIELD. HUBBARD'S MOWER AT WORK.



WOOD SAW.



CIDER MILL AND PRESS.

There were 25 entries of Plows, on which the following awards were made:

PLOWS.

Best plow for general purposes, Rice, French & Co., Springfield	$10
2d best, Baldwin, Dewitt & Co., Cleveland	5
Best stubble plow, Rice, French & Co., Springfield	10
2d best, Dorner & Nolte, Cleveland	5
Best sod plow, Wm. Whitely, Springfield	10
2d best, Dorner & Nolte, Cleveland	5
Best sub-soil plow, Pierce & Blakeslee, Cleveland	5
Best one-horse plow, Rice, French & Co., Springfield	5

AWARDING COMMITTEE.—Jacob Dillman, G. W. Woodworth, Geo. R. Brooker and David Law.

In the class of Vehicles there were 29 entries, to which the annexed awards were made:

VEHICLES.

Best two-horse family carriage, Merts & Riddle, Ravenna	$10
" top buggy, Brewster Co., New York	5

Best trotting wagon, Merts & Riddle, Ravenna $5
" street goods wagon, W. Y. Yates American Express Co., Cleveland 5
" Jack screw, G. T. Pierce, Cleveland 1
" willow cab for children, F. J. Body, Cleveland .... med
" wood cab for children, Cleveland Wood and Willow Manuf'g Co 5
" display of carriage wheels, hubs, etc., Chas. Leverett, Cleveland 5
" display of carriages and buggies, Merts & Riddle, Ravenna 20

AWARDING COMMITTEE.—T. B. Fisher, A. W. Hurlbut and Jacob Lawman.

There were 20 entries of Sewing Machines, and one entry of Knitting Machine. These received the following awards;

SEWING AND KNITTING MACHINES.

Best knitting machine, Miss S. Branson, for Aiken's machine, Cincinnati $5
Best sewing machine for manufacturing purposes, I. A. Isaacs, Singer's No. 2, Cleveland .. 5
Best sewing machine for family use, J. E. Strong, Wheeler & Wilson's, Cleveland 5
Best sewing machine not to exceed $50, D. M. Somerville, Howe's machine, Cleveland 5

New Style Cloth Presser and Hemmer.

Glass Braider.

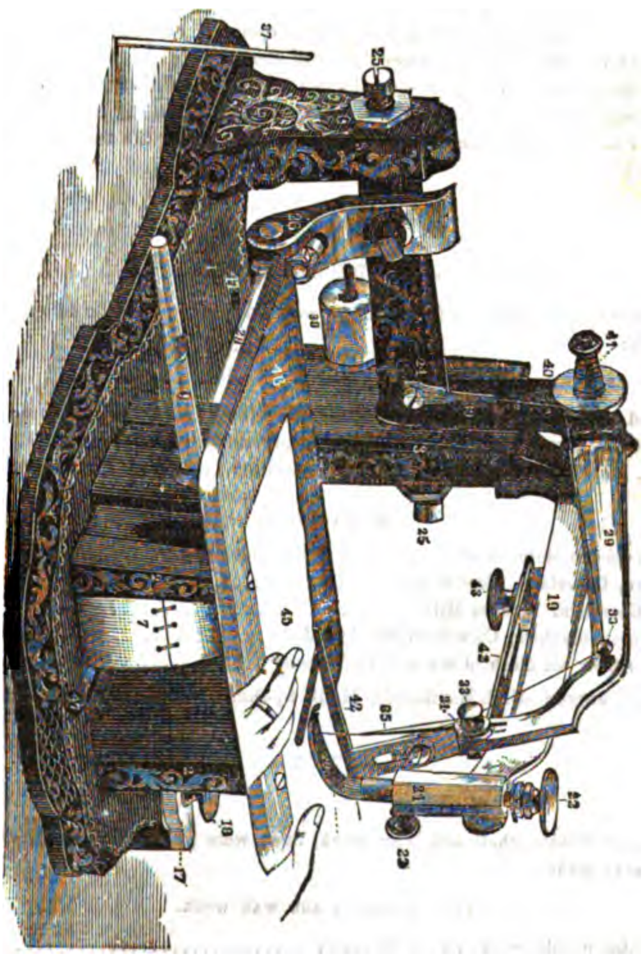
AWARDING COMMITTEE—Ira Rose, Mrs. N. S. Townshend, M. J. Hurst.

With an experience of eleven years in manufacturing and improving their machine, the Wheeler & Wilson Sewing Machine Company, sparing no expense to render the maching as perfect as can be made, have lately introduced several new improvements, among which are the Glass Cloth Presser and Hemmer and the Glass Braider, as represented in the following diagrams.

The Glass Cloth Presser enables the operator to see each stitch as it is formed, and to guide the work more accurately.

The Hemmer is easily attached by sliding it in the place of and substituting it for the Glass Cloth Presser, which is much more convenient than the old style Hemmer.

The Braider is a simple and ingenious device for stitching braid on any kind of fabric in the most elaborate designs, without any previous basting. The braid follows the needle with perfect accuracy, taking any curve desired, so that the most intricate pattern may be braided with great rapidity, and, as it is made of glass, the stamped pattern can be seen through it and readily followed.



WHEELER & WILSON'S SEWING MACHINE.

The Corder, made also of glass, holds the cord to its place, and is of great advantage in cord ing shirt bosoms, collars, etc.

The ingenuity of the Rotating Hook is wonderful from its remarkable simplicity; it dispenses with the dirt of lubrication, and requires no addition to the power needed to drive the machine, while the stitches are made more rapidly. A good deal of time is also saved in winding the bobbins to form the lock-stitch.

This invention of the Rotating Hook is that which has given character to the Wheeler & Wilson Machine, and although the stitch is the same as that originally produced by Howe, it is done by a more simple and ingenious method.

The Rotating Hook is upon the end of the main shaft that moves all the work, and is carved out of solid steel by a series of the most ingenious machines that we ever saw in operation. Indeed, it could not be made by any other means, so that every one would be perfect and exactly like every other one. As it revolves it seizes the loop of the thread in the needle the instant it passes through the cloth, opens it out and carries it around the bobbin, so that the thread is then passed through the loop of the stitch; this is then drawn up with the thread in the needle, so that the two are looped together about half way through the cloth, forming the strongest possible seam, showing the stitching exactly even upon both sides, with no threads above the surface to wear off and allow the seam to rip.

THIRD DEPARTMENT.

In the classes of silks and mill fabrics there wese 25 entries, and the following premiums were awarded:

SILK AND FABRICS OF SILK.

Best lb. reeled silk made in family, C. Reeves, Cleveland	$2
Best lb. sewing silk made in family, C. Cramer, Cleveland	2
Best pair silk stockings, Mary L. Sampson, Painesville	1

MILL FABRICS.

Best 10 yards woolen cloth, Cleveland Woolen Mills, Cleveland	$5
Best cassimere, Cleveland Woolen Mills	5
Best flannel, Cleveland Woolen Mills	3
Best pair woolen blankets, Cleveland Woolen Mills	5
Best 10 yards floor oil cloth, John and L. Webster	5

Awarding Committee—C. S. Martindale, H. B. Spellman, E. T. Sturtevant.

In the class of Needle, Shell, and Wax Work, there were 245 entries, in which the follow ing awards were made:

NEEDLE, SHELL, AND WAX WORK.

Best ornamental needle work, Fanny McGarry	$3
Best ottoman cover, Mrs. C. W. Coplin, Cleveland	3
Best specimen of wax fruit, Wm. Burger, Cleveland	3
2d best specimen of wax fruit, Miss. E. Craig, Cleveland	2
Best fancy work with needle, Miss. Erinda E. Thomas, Newburgh	3

Best worked collar, Miss. Emma Hills, Cleveland	3
Best crochet work, Mrs. C. C. Beardsly, Cleveland	3
Best worked quilts, Miss. M. O. Spring, Geneva	3
Best white quilt, Mrs. J. J. Shaler, Ashtabula	3
Best patch work quilt, Mrs. Margaret Johnson, Cleveland	3
Best silk patch work, Miss. Aurial Paine	3
Best lamp stand mats, Mrs. George W. Campbell, Delaware	3
2d best lamp stand mats, A. C. B. Lyman, Strongville	2
Best ornamental shell work, Mrs. W. F. Parker, Cleveland	3
2d best ornamental shell work, Mrs. S. Scrivens, Cleveland	2
Best specimens wax flowers, Mrs. Dr. Palmer, Cleveland	3
2d best specimens wax flowers, James Davis, Cleveland	2
Best embroidered sofa cushions, Mrs. Allen Richmond, Cleveland	3
Best embroidered mantillas, Hower & Higby, Cleveland	3
Best embroidered slipper, Miss. Lydia Weston, Warrenville	3
Best worked vail, Miss. Emma Vanderman	3
Best worked handkerchief, Mrs. Fanny M. McGarry, Cleveland	3
Best worked woolen shawl, Mrs. H. Selden, Cleveland	3
2d best worked woolen shawl, Mrs. H. Nesbitt, Elyria	2
Best silk bonnett, Mrs. M. P. Wheelock, Cleveland	5

In the class of Household Fabrics, there were 120 entries, with the following awards:

HOUSEHOLD FABRICS.

Best pair of woolen blankets, Mrs. R. Hawkins, Rockport	$5
2d best do. Mrs. M. A. Robb, Olmstead	3
Best 10 yards flannel, Mrs. M. A. Robb, Olmstead	5
2d best do. Mrs. Electa Ackley	3
Best woolen carpet, Miss. M. O. Spring, Geneva	5
2d best do. 15 yards, Mrs. Betsey Hornton, Painesville	3
Best 10 yards linen, Mrs. Merriman, Burton	5
2d best do. Miss. L. Phelps, Cleveland	5
Best 10 yards linen diaper, Mrs. C. L. Dayton, Alden, N. Y	5
2d best do. Mrs. M. A. Robb	3
Best 10 yards kersey, Mrs. A. Anderson, Painesville	5
2d best do. C. I. Dayton, Alden, N. Y	3
Best pair kersey blankets, Mrs. R. Hawkins, Rockport	5
2d best do. Mrs. Milo Caldwell, Painesville	3
Best rag carpet, 15 yards, Mrs. A. Morely, Lindenville	5
2d best do. Mrs. George Anderson, Painesville	$3
Best 15 yards tow cloth, Mrs. Milo Caldwell, Painesvlle	5
Best hearth rug, Mrs. C. E. Sweet, Cleveland	5
2d best do. Mrs. S. E. Oviatt, Richfield	3
Best double carpet coverlet, Mrs. W. W. Richards, Solon	5
2d best do. Mrs. R. Hawkins, Rockport	3
Best pair woolen knit stockings, Mrs. M. A. Robb, Olmstead	2
2d best do. Mrs. C. L. Dayton, Alden, N. Y	1
Best pair cotton knit stockings, Mrs. Zenas Judd, Ravanna	2

2d best do. Mrs. F. L. Richardson, Brooklyn		1
Best lb. of linen thread, Mrs. George Anderson, Painesville		2
2d best do. Mrs. A. Anderson, Painesville		1
Best pair of woolen fringe mittens, Mrs. E. A. Tyler, Crestline		2
2d best do. Mrs. M. A. Robb, Olmstead		1
Best pair of woolen mittens, Mrs. F. G. Lewis, Rockport		2
2d best do. Mrs J. T. Merriman, Burton		1
Best worsted knit stockings, Mrs. R. Hawkins, Rockport		2
Best stocking yarn, Mrs. M. A. Robb, Olmstead		2
Best woolen shawl, Curtis Cramer, Cleveland		2
Best mill bag, Mrs. M. A. Robb, Olmstead		2
Best gents' shirts, Mrs. E. E. Larnder, Cleveland		2
Best 10 lbs. dressed flax, Mrs. A. Anderson, Painesville		5
Best 5 lbs. bleached flax, Mrs. A. Anderson		2
Best 5 lbs. flax yarn, Mrs. A. Anderson		5

Awarding Committee—H. B. Spellman, C. S. Martindale, Mrs. W. J. West, Mrs. Samuel M. Young.

In worked metals there were 26 entries, to which the following awards were made:

WORKED METALS.

Best	display of copper work, L. A. Lammott, Marietta	silv med
	display of brass work, B. P. Bower, Cleveland	silv med and $5
	display of axes, Robins & Hunter, Norwalk	3
	display of plumbers' goods and ware, B. P. Bower, Cleveland	silv med
	display of iron fence, including posts, King, Bros. & Co., Ashtabula	diploma and 3
	display of Coopers' tools, M. E. Higley, Cleveland	5
	display of kitchen utensils of tin, Henry Blisk, North Fairfield, Ohio	2
Do	Wm. Pollybank, Cleveland	diploma

In the class of Stoves and Castings there were 13 entries. The premiums awarded were as follows:

STOVES, CASTINGS, ETC.

Best	cooking stove for wood, J. E. Hall, Cleveland	$5
	cooking stove for coal, J. J. Low, Cleveland	5
	parlor stove, J. J. Low, Cleveland	5
	warming furnace or other apparatus, L. E. Holden, Cleveland	med
	cooking range, J. J. Low, Cleveland	5

Awarding Committee.—J. Cooper, J. C. Danks and A. H. Wrenn.

In Cabinet Ware there were 13 entries, and premiums were awarded as follows:

J. J. Gillmore, Warren, O., chair for invalids $3

The following is the report of the committee:

The committee on Cabinet Ware report that but few articles of this ware were entered for exhibition, although it is of extensive use and manufacture, and on it liberal premiums were offered. The committee award a premium on an invalid chair, entered by Mr. J. J. Gillmore, of Warren, O. In their opinion the purposes of its construction are well attained by a variety of easy positions, which an invalid by a little exertion may give himself when using the chair.

J. F. MOORE,
J. H. MANSFIELD.

There were 20 entries in the class of Wooden Ware, and the committee made the following awards:

WOODEN WARE, ETC.

Best grain measures, D. W. Hickok, Jefferson, O	$2
turning lathe work, Otto Schmidt, Cleveland	3
osier willow, G. H. Lodge, Cleveland	2
sick couch or chair, J. J. Gilmore, Warren	3

AWARDING COMMITTEE.—M. A. Brown, James Taylor and Wells Aldrich.

In the class of Saddlers' and Shoemakers' Ware there were 34 entries, to which the following awards were made, and of which the committee reported as follows:

SADDLERS' AND SHOEMAKERS' WARE.

Best set farm harness, W. Pond, Elyria, O	$5
display hames and saddle-trees, M. R. Hazard, New London	3
display brushes, B. Figer, Cleveland	3
pair of dress boots, Geo. Sill, Cleveland	2
pair heavy boots, Smith & Dodd, Cleveland	2
pair gents' dress shoes, Smith & Dodd, Cleveland	2
pair Congress gaiters, Smith & Dodd, Cleveland	2
pair ladies' gaiters, Smith & Dodd, Cleveland	1
pair ladies' slippers, Smith & Dodd, Cleveland	1
pair bootees, Smith & Dodd, Cleveland	1
made suit of gent's clothing, Isaac A. Isaacs, Cleveland	5

REPORT OF COMMITTEE.

The undersinged have discharged their duty, by a careful examination of all the articles on exhibition in this class, and report as follows:

There was only one set of farm harness, but that was in every way worthy. One pair of hames—very superior.

The display of brushes—some very fine brushes, by Industrial School, but the best display was No. 7.

The committee were at some loss to decide upon gents' dress boots, but finally came to the conclusion that No. 16 should have the premium, combining more utility and strength, with a high order of finish and skill in the manufacture. We wish, however, to state that No. 6 (fancy dress boots) cannot be too highly commended as articles of taste and fancy skill. There were three entries of heavy boots, all good, but the best were No. 7. There was only one entry each of gents' dress shoes, congress gaiters, laidies' gaiters, ladies' booties, and ladies' slippers, but these were all of such excellent workmanship and quality, that we did not hesitate to award the premiums offered.

There was one entry only of gents' suit of clothes—a most excellent suit. We also commend

Nos. 2, 3 and 4 under the head of suits of gents' clothing. No. 5 (miscellaneous) is a very ingenious and worthy article for the army, or travelors depriv d of hotel or house accommodations. We highly recommend the boot and shoe pattern, No. 19, (miscellaneous); it must be a very useful article. The patent buckle (No. 34) we commend highly. (No. 31), brooms, an excellent article.

Submitted,

N. W. Goodhue,
John Wolfley,
H. Arntibus.

In the class of Chemicals there were 24 entries, to which the following awards were made:

CHEMICALS.

Best white lead, Morely & Carey, Cleveland	$1
specimen of lard oil, Morehouse & Merriam, Cleveland	1
display of blacking, T. Larter, Cleveland	1
lubricating coal oils, Morehouse & Merriam, Cleveland	3
display of writing fluid, J. N. Owen, Cleveland	1
display illuminating coal oils, Morehouse & Merriam, Cleveland	3

In the class of Philosophical and Surgical Instruments there were 13 entries. The premiums awarded were as follows:

PHILOSOPHICAL, ETC.

Best surgical instruments, J. Frederick, Cleveland	diploma
specimen dentistry, T. G. Bristor, Mansfield	diploma
electro-magnetic apparatus, Western Union Telegraph Co., Cleveland	diploma
chronometers, M. Burt, Cleveland	diploma

In the class of Glass and Crockery there were 25 entries, but the committee failed to report any awards whatever.

FOURTH DEPARTMENT.

In the class of Flour and Grain there were 55 entries, to which awards were made as follows:

FLOUR AND GRAIN.

Best bbl flour, Ohio manufacture and Ohio wheat, Dutton & Preece, Cleveland	$5 and dip
2d best, Chas. W. Coe, Cleveland	3 and dip
Best sample of white winter wheat, not less than half a bushel, Thos. Hird, East Rockport	$5
Best sample of red winter wheat, not less than half a bushel, Geo. Anderson, Painesville	5
Best sample rye, not less than half a bushel, Andrew Wemple, Collamer	3
Do do oats do, Thos. Bushnell, Haysville	3
Do do barley do, R. Baker, Avon	3
Do do buckwheat do, Thos. Bushnell	2
Do do flax seed do, Geo. Anderson, Painesville	3

Best sample timothy, not less than half a bushel H. S. Hunt, Euclid	3
Do do clover seed do, Geo. Anderson, Painesville	3
Do do orchard grass do, ½ bu., J. M. Tubbs, Cleveland	3
Do do yellow corn, J. H. Perrine, Lebanon	3
Do do white corn, J. H. Perrine, Lebanon	3

Committee recommend that second as well as first premiums be offered for grain and seeds, as this department of agriculture is deserving of special encouragement.

J. M. GLOVER,
T. F JOY,
I. DRIGGS.

STATEMENT OF DUTTON & PREECE.

1 bbl. white wheat flour, from St. Clair Mills, Cleveland, from wheat raised by Mr. Woolrich, East Cleveland, Cuyahoga county, O.

From 34 bushels: 5½ bbls. choice; 1¼ bbl. superfine, and ½ bbl. canal.

CHEESE.

There were 14 entries of Cheese. Annexed is a list of the awards, statement of the manufacturers, and the report of the committee.

Best cheese, 1 year old and over, H. F. Giddings, Lindenville, O	$10
2d best, S. E & H. N. Carter, Leroy, O	5
Best and largest lot, A. Bartlett, Munson, O	20
2d best, E. C. Cox, Mesopotamia	10
Best cheese under one year old, H. Stevens, Sheffield	10
2d best, S. E. & H. N. Carter, Leroy	5

To the Awarding Committee on Cheese:

GENTS: You are presented with twelve samples of cheese, to which your attention is called, and a careful examination respectfully solicited. Numbers 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 and 11, were made the 2d, 3d, 4th, 5th, 6th, 7th, 10th, 11th, 12th, 13th and 14th days of June, 1863. Number 12 was made the 21st day of July, 1862, from the milk of 80 cows, evening and mornings milk, with no addition of cream.

PROCESS OF MANUFACTURE.

The evening's milk is strained into the vat, and the animal heat taken therefrom by pouring cold water into the water chamber of the vat, and setting tin holders filled with water into the milk.

What cream has arisen during the night is applied into the steamer, and the morning's milk poured on to it. A fire is made in the heater and milk brought to a temperature of 84 degrees. Enough rennet is then added to coagulate the milk and make it sufficiently firm to cut in 60 minutes. Then cut with a wire cutter into inch square blocks; it then stands 20 minutes; then work the curd carefully with the hands 20 minutes; then take off a portion of the whey and start a fire in the heater; commence heating gradually, stirring carefully until the temperature reaches 94 degrees, then shut off the heat and cover the vat with a cloth and let it stand 60

minutes; then take off some more whey, start the fire, and continue to work the curd with the hands until it is raised to a temperature of 104 degrees; cover with a cloth and let stand one hour, or until sufficiently cooked; then get the whey off, and salt with Onondagua factory filled salt—two pounds and four-tenths to the 100 gallons of milk; work the curd fine before putting to press. Press one day with two-inch wrought-iron screws as hard as one man can turn with a lever four feet long. After taking from the press, grease and turn every day.

PREPARATION OF RENNET.

Kill the calf at five days old, when their stomachs are empty, salt them inside and out, and hang them up to dry. When one year old and dry, put one dozen into a crock, to which add salt and water, let stand until the strength is out, when it is fit for use.

To the questions propounded we answer as follows:

1. Improved natives.
2. Timothy, red and white clover.
3. Long continued pasturing exhausts the soil. Rotation of the grasses with other crops rightly managed will improve it.
4. When cheese commands 8 cents per pound, dairy lands may be used profitably at $35 per acre.
5. The proper temperature of a room for curing cheese should range from 75 to 80 degrees. A much higher temperature would cause too rapid a state of fermentation; causing a sharp pungent flavor and bitterness. At a much lower temperature fermentation is too slow, causing the whey or moisture to remain too long in the cheese, causing a sourish bitterness.

S. E. & H. N. Carter.

To the Committee of Judges on Cheese at the Ohio State Fair, 1863:

Gents: The cheese offered for exhibition are a sample of 1,200 cheese of an uniform size and quality, manufactured by me during the present season, at the Barlett Dairy, in Munson, Geauga county, Ohio.

THE PROCESS OF MANUFACTURE.

The milk at night is received and put into tin vats, set inside of wooden ones, and a stream of cold spring water set running through the wooden vats to keep the milk cool and sweet, and kept running all night.

In the morning the milk is again received and put in with the last night's milk. the temperature of the whole raised to 82 deg. Fahr.; coloring is added sufficient to produce a rich cream color, and sufficient rennet to produce perfect coagulation in one hour. The whole mass is then stirred until it begins to thicken, and is then left until the curd is sufficiently formed to commence working. It is then cut up very fine, heat raised to 88 degrees, thoroughly stirred 20 minutes, and then allowed to stand for the curd to settle, the whey is then drawn off down to the curd; the curd is then finally broken up and the heat raised to 98 degrees; it is then kept stirred for an hour, so that it shall not pack together, and then allowed to stand until the curd is done, the heat maintained at 98 degrees all the while. When the curd is finished and firm, it is dipped into a drainer, where the whey runs off, and three pounds of salt to every 100 gallons of milk is added, and thoroughly worked in and incorporated with the curd. It is then put into the press, pressed two hours, taken out, turned over, and a cloth bandage put on, replaced in the press and left until the next day It is then taken from the press and rubbed over with grease, carried to the curing rooms and placed on the ranges, turned and rubbed every day until cured.

PREPARING AND PRESERVING RENNET.

A calf should never be killed for the rennet at less than five days old, and ten days is better. Let the calf have a full meal of milk, and let him stand 16 to 18 hours, kill him, take out the rennet, turn the skin wrong side out, give it a shake, rub thoroughly with salt, turn it right side out, rub with salt, stretch on a small bow and hang up to dry.

To prepare it take one gallon for each skin, and at 90 degrees temperature, soak three days, stirring and rubbing the skins each day. Add a *large* quantity of salt and it is ready for use.

ANSWERS TO QUESTIONS BY THE BOARD.

1. Our common stock crossed with Devon I consider the best for dairy purposes.
2. White clover decidedly the *best* variety of grass for butter and cheese.
3. Unless manures are carefully husbanded and judiciously applied, long grazing does injure land for dairy purposes. With careful husbandry and judicious management it does not.
4. From $25 to $30 per acre.
5. 70 degrees Fahr. A higher temperature tends to make a cheese strong flavored, and a lower temperature sometimes makes a cheese bitter in taste.

No. of cows worked 80—ten to eleven cheese made per day. No addition made of cream. A screw press is used and we intend to give each cheese six tons pressure.

A. BARTLETT.

E. C. COX'S STATEMENT.

To the Committee of Judges on Cheese:

The cheese that I have offered for inspection was made between the 20th and 25th of June; No. of cows, 430; was made from one milking only. No addition of cream. No rennet used with the curd. Pressed with a screw press—pressure not known. Pressed from 24 to 36 hours—prefer from 36 to 40 hours; then keep in a cool well ventilated room.

E. C. COX.

C. H. DUNBAR & SON'S STATEMENT.

One cheese, made about July 12. 1863. No. of cows, 28. Made from two milkings. No addition of cream. Rennet prepared with salt and water. Pressure, self-press.

TREATMENT.

Caps remain in two weeks, then remove and grease, turning every day.

1. Native cows.
2. White clover.
3. According to use.
4. $30 per acre.

HAMMON STEVEN'S STATEMENT.

My cheese was made the last of June and first of July, from the milk of 18 cows, at two milkings, with no addition of cream. Rennet, when taken from the calf, turned and carefully washed in sweet whey or milk; turn them back, salt well, stretch on a stick and hang by the stove until well dried, then put in a bag or sack and hang in a dry place. Prepare two rennets in a gallon crock, filled with water, salt well, set in a cool place, and strain through a cloth when ready for use. I press with a lever. The amount of pressure is 1,500 pounds. Grease the surface when taken out of the hoop, and the balance when dry; turn it every day, rubbing it frequently with lard or butter.

I consider the native breed of cows the best; they produce an equal amount of butter and cheese that a large blooded cow will, with about two-thirds the expense of keeping. Best grass for pasture is timothy and white clover. Long continued pasturing exhausts, and the wild and June grass runs out the tame and produces less feed. In this section $20 would be about an average; some farms would be profitable at higher and some lower; about 75 degrees is the right temperature for curing cheese. In a higher temperature they would be likely to mould and sour. I set milk in a vat over night, skim the thickest part of cream in the morning, then add morning's milk, cool or warm to 80 degrees; add sufficient rennet to fetch curd in 30 minutes, then break curd fine, raise the heat moderatelely to 100 degrees, stirring the curd frequently, draw off whey; one teacup of salt to 18 pounds; cool to 80 degrees; press and preserve as above stated, and you have such a cheese as I make.

HAMMON STEVENS.

STATEMENT AS TO ELDRIDGE'S CHEESE.

The four cheese exhibited were made June 13, 14, 15 and 16. He keeps 200 cows. The cheese is made from two milkings. All the cream is worked into the cheese. Rennet is preserved with salt, and prepared by soaking in pure spring water. The cheese is pressed with iron screws, the amount of presure very heavy, but not ascertained. The best cows we have are a cross of the Durham and common stock. Our grasses are common—don't know which are the best. Dairying properly managed improves land. The price per acre for which land can be profitably used for dairy purposes depends on the quality. The proper temperature of a room for curing cheese is 70 degrees Fahr.

The milk at night is put into a tin vat. The tin vat is put into a wooden vat, which is about two inches larger each way. This space is filled with cold spring water and the milk gently stirred until reduced to 60 degrees Fahr. Then the water is left to run all night around the milk. The cream in the morning is mixed with milk by straining and stirring The rennet is put in after morning milk is put in and the heat raised to 80 degrees Fahr It is left quiet for about 40 minutes, or until the curd breaks with sharp corners by passing the fingers through it The curd is then thoroughly broken with the hands. The most of the whey is then drawn off with a siphon. The heat is then raised to 100 degrees Fahr. and left to cook about an hour. The balance of the whey is then drawn off The curd is put into a drainer and salted, about one pound of fine dairy salt to 40 pounds of curd It is then put into presses and pressed about three hours, when it is taken out and bandaged and put back into the press to remain until the next day. When first taken out of press the cheese is thoroughly greased and removed to the curing room, where they are turned every day and rubbed.

JOHN I. ELDRIDGE.

To the Hon. Judges on Cheese, at the Ohio State Fair, 1863:

The *two cheese* over one year old, exhibited by me, were made on May 27th and June 1st, '62, and the five under one year old. on the 4th, 5th, 6th. 7th and 8th days of June. Each cheese was made from the milk of 38 cows, at two milkings, with no addition of cream.

MODE OF PREPARING AND PRESERVING RENNET.

The calves are killed when five days old, with an empty stomach, which is usually about 18 hours after sucking. More cheese can be made from a rennet taken from a calf soon after sucking and saved with the contents, but the *flavor will not* be as good. When taken out, the rennets are thoroughly salted and stretched on hoops to dry—care being taken to hang them so as to drip as little as possible. Rennets are not fit for use until one year old or over. When wanted for use, half a dozen dried rennets are soaked 24 hours in one gallon of soft water, with as much salt added as will dissolve; the skins are then taken out, and afterwards soaked again

until the strength is exhausted. The liquor thus prepared will be of uniform strength, and, after using from it once or twice, the amount required to bring the cheese in proper time will be ascertained.

ANSWER TO QUESTIONS.

1. The native breed of cows, or a cross between the native and Devon, are generally better adapted for dairying than either the Shorthorn or Devon.

2. Our pastures are principally stocked with June grass, white clover and red top, which probably furnishes as good pasturage for making cheese, as any kind we have.

3. Think it will improve if rightly managed.

4. The price depends much upon the situation and quality of soil, whether supplied with suitable buildings or not, &c. In this vicinity it would probably range from $25 to $35 per acre.

5. From 70 to 75 degrees is the proper temperature for a room for curing cheese. If the heat is less than this, more time will be required for curing; if greater the cheese is apt to get "huffy," and require considerable attention.

6. Good aparatus for making cheese is an important item in dairying. A person *may* get along with an old fashioned *cheese tub*, press and a kettle, yet the saving of time, fuel and labor in using convenient fixtures would soon pay for the extra expense. We use "*H. A. Roe's Premium Cheese Vat and Heater*," which undoubtedly combines more advantages than any other apparatus introduced. As fast as the night's milk is taken into the dairy room it is strained into the *vat*, and well cooled by turning cold water into the water chamber. When the water becomes warm, it is drawn off, and more cold water turned in; with this process the milk is kept sweet and rich, and but little cream rises over night. In the morning the milk is strained into the same vat with the milk of the night before, and a fire kindled in the heater about 20 minutes before time for setting, the temperature being then from 84 to 85 degrees; enough rennet is added to curdle the milk in about 45 minutes. As soon as the curd is well formed it is thoroughly broken with an instrument made for that purpose; this being done, the curd is allowed to settle a few minutes, when the fire is again started, raising, gradually, the temperature to 100 and 102 deg.; the heat is then checked by the damper, so as not to rise above that point; the curd is well stirred and broken during the first part of the heating process. When the curd is sufficiently scalded the water is drawn off, and afterwards the whey. After the whey is drained off and broken up, the salt is put in, at the rate of a teacup full to 14 pounds of pressed cheese. After putting in the press it is thoroughly pressed two days, being turned in from two to three hours, also the next morning. It is impossible to have a rule which will always produce uniform results—as much depends upon the milk, weather &c. How and when to do this can only be learned by experience and careful observation.

H. F. GIDDINGS.

REPORT OF COMMITTEE ON CHEESE.

In making our report for this class, your committee would state that the display of cheese on exhibition was very fine, and the composition so close that it was with difficulty we came to conclusions satisfactory to ourselves, and that we have done entire justice we can hardly hope. In fact, except in one or two instances of different manufacture, the competition was so close, that had the specimens been all from one dairy, they would have done credit to that dairy from their uniformity. We award as follows:

Best cheese, one year old and over, entry No. 11, H. F. Giddings, Lindenville, O.
2d best, entry 7, S. E. & H. W. Carter, Ohio State Dairy, Leroy, O.
1st best and largest lot of cheese, entry 2, Anson Bartlett, Hudson, O.
2d best do do 3, E. C. Cox, Mesopotamia, O.

1st best cheese, one year old, entry 3, Harmon Stevens, Sheffield, Lorain county, O.
2d best do do 6, S. E. & H. W. Carter, Leroy, O.

In coming to the conclusion and making the awards we have, we have been governed by the general appearance, the quality for cutting, and also fitness for transportation; in other words for handling and merchantable purposes. As the very large proportion of the amount manu factured, must necessarily be transported to a greater or less distance, this is a consideration of importance. If but one of these qualities were taken into account, a different conclusion might have been reached. For instance, the Ohio State Dairy cheese must be very rich for cutting, but apparently might fail in handling; while entry No. 2, to which the committee award 1st best in lot of cheese, appear well as both cutters and handlers. As has been intimated, every lot was good and every specimen creditable—one thing which caused some little difficulty in aiming at correct conclusions, arose from the classifications adopted by the Board. The manufacture of cheese is annually gaining in attention and importance in the northest counties of the State, and in the system of manufacture there has, within a year or two past, been a great change. Formerly each farmer made his own cheese, upon the farm, in dairies of from ten to a hundred cows; now a number unite together, building a factory, or individuals build such factories, purchasing the milk, or taking it to make up at so much by the pound. In this mode of manufacture, a somewhat different description of cheese is made, having some advantages farmer dairies cannot have. The suggestion we wish to make is, that in view of the magnitude of this interest and increasing its importance, such a classification be hereafter made as will enable "factory" cheese to compete only with "factory" cheese, and "farm dairy" with "farm dairy."

P. Hitchcock,
E. Bemiss,
Thos. F. Kibborn,
F. H. Cannon,
L. T. Wilmot.

BUTTER, BREAD, ETC.

In the class of Butter, Bread, &c., there were 64 entries, the following are the awards, and the statements of the exhibiters:

Best lot 10 lbs. butter in rolls, Mrs. G. S. King, Madison	$10
2d best do. Mrs. W. Brown, Rockport	5
Best lot not less than 25 lbs., made in May or June, Mrs. R. Hawkins, Rockport	10
2d best do. Mrs. M. A. Robb, Olmstead	5
Best tub or firkin not less than 50 lbs., made any time, Frank Oakes, Brecksville	10
2d best do. H. Lane, Geneva, Ohio	5

BREAD AND CEREAL FOOD.

Best 3 leaves baker's bread not less than 48 hours old, John Truber, Cleveland	$3
Best biscuit, Mrs. S. W. Whipple, Cleveland	2
Best soda biscuit, Mrs. Sarah W. Whipple, Cleveland	2
Best 3 loaves domestic white bread, not less than 48 hours old, Mrs. W. Brown, East Rockport	3
Best domestic corn bread, Mrs. W. G. Smith, Cleveland	3
Best domestic rye bread, Mrs. G. Perrine, Milan, O	3
Best domestic brown bread, Mrs. G. Perrine, Milan, O	3
Best 6 hams, Mitchel & Ladd, Cincinnati	3
Best half bbl. mess pork, B. Stedman, Cleveland	3
Best half bbl. beef, B. Stedman	

Awarding Committee.—C. C. Wick, Miss Louisa Sumner, Mrs. Smith Grimes, Mrs. O. Waters.

STATEMENT OF R. BAKER.—Two jars butter made from two cows from 10th to 20th of June. The cows were fed on grass only. Milk strained into tin pans, and remained 36 hours; then skimmed, and the cream churned in Dewitt's Ther. Churn; used three-fourths of an ounce of Liverpool salt to one pound of butter. No other ingredients used.

STATEMENT OF WM. HURST.—Ten pounds butter in rolls, made September 12th, from seven cows; no other feed but grass. Milk strained in ten quart tin pans; kept thirty-six hours in cellar, with plenty of air circulating through. Churned in a box churn; buttermilk freed from it with a ladle; no water used. Used fine Liverpool salt, three-fourths of an ounce to the pound; no other substance used.

STATEMENT OF HAMMON STEVENS.—My butter was made the last of June; my new butter last week of June, from 18 cows. A small mess of wheat bran and whey was given to each cow twice a day; the milk set over night in a cheese vat. Churned in a stone churn, butter washed with cool water. Salt to suit the taste with Ashton salt. No other substances used.

My mode of managing bees at present is very simple. I have had three different patent hives; I put my bees into a box hive with a hole two inches in the top, and set them in a house made for that purpose, with one side open. This box was put on top of the hive the early part of May, and taken off the first of September. H. STEVENS.

STATEMENT OF MRS. S. W. DILLE.—Ten pounds of butter in rolls. Made on the 12th day of September, 1863, from six cows, grass fed. Milk set in tin pans; skimmed and churned as soon as the milk soured, in a crank churn of "Foss patent." The milk worked free from the butter by hand with ladle. Salt, one and one-half ounce to the pound, common barrel salt. No other substance used.

HONEY, PRESERVES, PICKLES, ETC.

In the class of Honey, Preserves, Pickles, &c., there were 175 entries, on which the following awards were made:

Best 10 lbs honey, R. Holly, Warrensville	$5
2d best, W. A. Flanders, Shelby	3
Best collection of preserves, Mrs. J. H. Sargent, Cleveland	5
Best pickled cucumbers, Mrs. J. H. Sargent, Cleveland	1
Best pickled peaches, Mrs. M. A. Robb	1
Best pickled tomatoes, Mrs. M. A. Robb	1
Best pickled butternuts, Mrs. M. O. Spring, Geneva	1
Best pickled melons, Mrs. Minuse, Milan	1
Best pickled onions, Mrs. M. J. Blair, Cleveland	1
Best preserved blackberries, Mrs. M. Church, Painesville	1
Best preserved raspberries, Mrs. M. A. Robb, Olmstead	1
Best preserved tomatoes, Mrs. M. Church, Painesville	1
Best preserved peaches in cans and jars, Mrs. J. H. Sargent, Cleveland	1
Best preserved pairs, Mrs. J. H. Sargent, Cleveland	1
Best preserved gooseberries, Mrs. M. O. Spring, Geneva	1
Best preserved quinces, Mrs. J. H. Sargent, Cleveland	1
Best currant jelly, Mrs. J. H. Sargent, Cleveland	1
Best gallon apple jelly, Mrs. J. H. Sargent	1
Best pickled gherkins, Mrs. J. H. Sargent, Cleveland	1
Best tomato catsup, Mrs. Minuse, Milan	2
Best cucumber catsup, Mrs. M. A. Robb, Olmstead	2

AWARDING COMMITTEE—D. W. C. Sawyer, Mrs. J. T. Newton, Mrs. D. W. C. Sawyer, Mrs. R. E. Pennywell.

SUGAR EVAPORATORS AND MILLS.

In the class of Sugar, Evaporators and Mills, there were 37 entries; the following is the lis of premiums offered in this class:

Best sorgho mill		$10
2d best do	Silver Medal or	7
Best sorgho evaporator		10
2d best do	Silver Medal or	7
Best half acre sorgho made into syrup*		20
2d best do do do	Silver Medal or	7
Best 10 lbs. of sorgho sugar†		40
2d best do do		5
Best gallon sorgho syrup		10
2d best do do		5
Best gallon maple syrup		5
Best 10 lbs. maple sugar		5

In the Agricultural Report for 1857 is a statement copied from a publication of Joseph Lovering of his experiments in the manufacture of sugar from the Sorgho, in which he says "it is about as easy to make good sugar from the Chinese sugar-cane as to make a pot of good mush, and much easier than to make a kettle of good apple-butter." This paragraph has been extensively copied by manufacturers of Sorgho Evaporators and Sorgho Mills in their catalogues, and led many persons to think that Sorgho sugar was as readily produced as a "pot of mush," or a "kettle of apple-butter." After repeated experiments many intelligent persons failed to produce any sugar, until many persons, and even some manufacturers, doubted whether sugar could be produced at all, notwithstanding the fact that the Board had paid premiums on Sorgho sugar for three or four successive years. Statements were at various times made to several members of the Board that no Sorgho sugar had been produced in Ohio, and that in all the cases where premiums had been awarded on Sorgho sugar, that it had never been awarded to any person who could prove, or even claimed to have made it. In order to fulfil their mission the Board proposed that of disseminating correct knowledge upon subjects connected with Agriculture, the Sorgho Sugar should be produced upon the Fair Grounds during the Fair. This proposition did not meet the views of parties manufacturing Evaporators, and produced quite a number of protests, from among which we select the following one, because it is the shortest, clearest, fullest, and embraces all the points of the more lengthy ones. It is the desire and object of the Board to give proper encouragement to every branch of productive industry connected with agriculture, and the Board is free from prejudice in favor of or against any special processes or machinery by which the end is attained. The following is a list of awards:

The undersigned, awarding committee on Sugar (Class 7, Fourth Department,) at the last State Fair, having been informed that the awards made are regarded as informal from the absence of our signatures thereto, we respectfully submit the following as our report:

Best Sorgho Mill, Clark Sorgho Machine Company, Cincinnati.
2d best do C. & J. Cooper, Mt. Vernon.
Best Sorgho Evaporator, Blymyer, Bates, & Day, Mansfield.
2d best do do no award.

* The culture of the plant, and process of manufacture, and quantity of syrup produced, to be stated in writing, sworn to by the manufacturer, and filed with the Secretary.

† The sugar to be manufactured during the Fair, on the grounds, from the Sorgho or Imphee cane.

Best half acre Sorgho made into syrup, no exhibiter.
Best 10 lbs. Sorgho Sugar made on the ground, no exhibiter.
Best gallon Sorgho Syrup, John L. Gill & Son, Columbus, made in Jacob's Evaporator.
2d best do do Miss M. O. Sprague, made in Cook's Evaporator.
Best gallon Maple Syrup, Z. K. Eggleston, Geauga county.
Best sample Maple Sugar, do do
Maple Sugar by Geo. Brockett, and Maple Syrup by G. S. King and G. Brockett, commended.

E. S. Ricker,
F. N. Barger,
Fred. E. Frey.

PROTEST.

To the Ohio State Board of Agriculture:

Gentlemen:—In your list of premiums, No. 48, Class VII, exhibiters of Sorgho Sugar are required to make it upon the ground during the Fair. The effect of this is to rule out hundreds of farmers who have been successful in the manufactuie of Sorgho Sugar since your last Fair and who would gladly have competed for the premium had it been open to them. As they cannot be expected to bring the necessary appliances, they, the real sugar manufacturers of the country, are practically ignored. But to say nothing further on this point, as the manufacturers of the only Evaporator that has obtained any notority for, or been at all successful in the production of Sorgho Sugar from the Sorgho or Imphee canes, we beg leave to call your attention to a few facts concerning the production of Sorgho Sugar in connection with the above condition, a condition which we presume was inadvertantly adopted.

1st. At the various National and State Fairs and Sorgho Conventions, to this date, about 200 samples of merchantable Sorgho Sugar have been offered, and all but one or two small ones were made on the Cook Evaporator, and this result in face of the fact that large premiums were offered for the production of Sorgho Sugar by any mode whatever, and also of our well known claim that this is the only Evaporator that can with any certainty produce sugar.

2d. You will allow us, then, modestly to assume that the conditon attached to the premium may not inappropriately be considered as pointed at the Cook Evaporator.

Now a few facts in regard to sugar making: In all our publications, and in all remarks at Fairs, Conventions, &c., no other claim has been made by us than substantially this: That by Cook's method the syrup is so prepared as to render crystalization more certain than by any other, and with good cane and the use of the Evaporator, without any chemicals, and a high even temperature, the crystalization may be rendered absolutely certain. It having sometimes occurred within 12 to 24 hours, we have so stated it, and from this has arisen the mistaken supposition that we claimed, always, to be able to effect crystalization immediately upon the ground. But as crystalization is a work of nature, it cannot be told with certainty, and we have never claimed that it could, whether it will be completed in 12 hours or 12 days.

Experience, both North and South, has demonstrated that owing to various causes, the length of time required for crystalization of the syrup is prepared, varies. Hence it is no test of the sugar making quality of any evaporator should the syrup fail to crystalize within a specified short time.

We can cite several cases where parties have gone to work deliberately upon a wager, and under the watchful eyes of three disinterested witnesses, and produced sugar in 48 hours, and drained it so completely that it was dry, merchantable sugar within five days from the grinding of the cane.

But with the imperfect appliances on a Fair Ground, with immature cane nipped by the frost

with no warm room where a high even temperature can be kept up, the probabilities would be against the most successful operator.

We respectfully suggest, therefore, that the condition above referred to be waived, and that the premium on Sorgho and Imphee Sugar be awarded to the best sugar made since the last Fair, the samples on exhibition to be not less than 20, 50, or 100 lbs. each, as you may decide.

Yours respectfully,

BLYMYER, BATES & DAY.

Manufacturers Cook's Evaporator.

VEGETABLES, ROOTS, ETC.

In the class of vegetables, roots, &c., there were 312 entries, on which the following awards were made:

Best one-half bushel Neshannock potatoes, G. S. King, Madison, O.	$3
2d best, W. H. H. Akins, Brooklyn	1
Best one-half bushel Pinkeye potatoes, F. G. Lewis, Rockport	2
Best one-half bushel Peach Blow, G. H. Lodge, Cleveland	2
Best of any other variety not named above, E. S. Willard, Cleveland	2
Best and greatest variety of Irish, G. S. King, Madison	5
Best one-half bushel sweet potatoes, E. S. Willard, Cleveland	3
2d best, G. H. Lodge, Cleveland	1
Best 12 parsnips, E. S. Willard, Cleveland	2
Best 12 carrots, John Smith, Cleveland	2
Best 6 long blood beets, John Kelly, East Cleveland	2
Best 6 turnip beets, E. S. Willard, Cleveland	2
Best 6 sugar beets, E. S. Willard	2
Best display of beets in variety and quality, John Smith, Cleveland	4
Best peck of tomatoes, Peter Herker, East Cleveland	2
2d best, J. Baisch, East Cleveland	1
Best display of tomatoes in variety and quality, John Smith, Cleveland	4
Best 3 drum-head cabbage, E. S. Willard, Cleveland	2
Best 3 red dutch cabbage, E. S. Willard	2
Best 3 of any other, not named above, John Kelly, East Cleveland	2
Best 3 heads of cauliflower, John Marshall, Brooklyn	2
Best head of broccoli, John Marshall	1
Best 6 heads of lettuce, John Marshall	1
Best one-half peck red onions, John Seaber, East Cleveland	1
Best one-half peck of yellow onions, H. W. Payne, Brooklyn	1
Best peck of white onions, Peter Herker, East Cleveland	1
Best display of onions in variety and quality, E. S. Willard, Cleveland	3
Best one-half peck of peppers for pickling, F. T. Sherwin, East Cleveland	1
Best display of peppers in variety or quality, G. H. Lodge, Cleveland	2
Best 6 roots of salsify, Lewis Ford, East Cleveland	1
Best 6 stocks of celery, J. Seaber, East Cleveland	2
Best 3 marrow squashes, E. S. Willard, Cleveland	2
Best 3 Hubbard squashes, G. H. Lodge, Cleveland	2
Best 3 crook-neck squashes, M. B. Oviatt, Euclid	2
Best display of squashes in variety and quality, G. H. Lodge, Cleveland	3
Best and largest pumpkin, J. Baisch, East Cleveland	2

Best display of pumpkins in variety and quality, G. H. Lodge, Cleveland................ $3
Best peck of sweet corn in ear, F. G. Lewis, Rockport.................................... 2
Best display of sweet corn in ear, G. H. Lodge, Cleveland 3
Best 3 mountain sweet watermelons, P. Herker, East Cleveland........................... 2
Best 3 watermelons of any other variety, J. S. Blackwell, East Cleveland................ 2
Best 3 green fleshed musk-melons, J. Baisch, East Cleveland 2
Best 3 yellow fleshed musk-melons, J. B. Lottridge, Rockport 2
Best and greatest display of melons of all varieties, both water-melons and musk-melons, P. Herker, East Cleveland 4
Best 6 radishes, J. Baisch, East Cleveland... 1
Best one-half peck of Lima beans, J. M. Tubbs, Cleveland................................. 2
Best peck of kidney bunch beans, J. B. Lottridge, Rockport 2
Best peck of pole beans other than Lima, J. B. Lottridge, Rockport...................... 2
Best peck of field peas, J. D. Herrick, Jefferson.. 2
Best half peck of garden peas, H. Stephens, Sheffield 2
Best and greatest variety of peas, J. D. Herrick, Jefferson 3
Best half peck of gherkin cucumbers, G. H. Lodge, Cleveland 1
Best 2 apple pie melons, Mrs. G. Perrine, Milan 1
Best 3 purple egg plants, E. S. Willard, Cleveland....................................... 1
Best 6 stalks of rhubarb, F. T. Sherwin, East Cleveland.................................. 2
Best and greatest variety of vegetables raised by one exhibiter, E. S. Willard, Cleveland.. 10

AWARDING COMMITTEE—D. C. Richmond, Henry Ridenour, Geo. W. Slingluff, Henry Bennett.

FIFTH DEPARTMENT.

FLOWERS, STOVE, AND GREEN HOUSE PLANTS—PROFESSIONAL LIST.

In the class of professional flowers, there were 42 entries, to which the following awards were made:

Best collection of not less than 20 varieties, variety and growth being taken into consideration, M. Hagerty, Cleveland.. $10
Best 12 varieties, as above, M. Hagerty, Cleveland....................................... 5
2d best.. 3
Best specimen plant in or out of bloom, M. Hagerty, Cleveland............................ 3
Best display of not less than 10 varieties of variegated leaved plants in or out of bloom, M. Hagerty, Cleveland.. 3
2d best, R. H. Boemer, Cleveland... 3
Best single specimen, M. Hagerty, Cleveland.. 1
Best collection of aloes and cactus in pots, J. P. Fletcher, Cleveland 2
Best collection geraniums in bloom, not less than 10 varieties, M. Hagerty, Cleveland..... 3
Best and greatest display roses named, M. Hagerty, Cleveland............................. 3
Best display of coxcombs and amaranths, J. Gallup, Cleveland 2
Best display of gladiolas, M. Hagerty, Cleveland... 2
Best hanging basket, M. Hagerty.. 2
2d best, G. J. Proback... 2
Best floral ornament, G. J. Proback, Cleveland 5
2d best, Mrs. H. Wick, Cleveland... 3
Best collection of fuchsias in pots, growth and variety to be taken into consideration, G. J. Proback, Cleveland 3
Best display of asters, Peter Herker, East Cleveland 2

Best pair parlor boquets, without regard to style, B. H. Boemer, Cleveland................ $2
Best 20 varieties of dahlias, J. P. Fletcher 5
2d best, Bateham & Hanford, Columbus.. 2
Best 12 varieties of dahlias, McIntosh & Co.. 3
2d best, J. P. Fletcher.. 1
Best display of verbenas in pots, B. H. Boehmer.. 3
2d best cut verbenas, J. P. Fletcher... 2
2d best cut roses, J. P. Fletcher.. 2

AWARDING COMMITTEE.—H. B. Lum, Mrs. H. Brown, Mrs. Stephen Boalt.

AMATEUR LIST.

In the class of amateur flowers there were 83 entries, to which the following awards were made:

Best collection of 20 varieties green house plants, Geo. Morgan, gardener to Jos. Perkins..$10
2d best, H. B. Hulburt.. 1
Best collection of 12 varieties green house plants, H. B. Hulburt......................... 5
2d best, Geo. Morgan.. 3
Best collection 6 varieties greenhouse plants, H. B. Hulburt.............................. 5
2d best, John Smith... 4
Best collection 10 variegated plants, Geo. Morgan... 3
2d best, H. B. Hulburt.. 3
Best collection cut flowers, Geo. Morgan.. 3
2d best, John Smith... 2
Best collection 10 gloxinias and achimenes, Geo. Morgan................................... 2
Best collection ferns and Lycopodiums, H. B. Hulburt...................................... 3
Best collection verbenas in pots, John Smith.. 3
2d best, H. B. Hulburt.. 2
Best collection petunias in pots, H. B. Hulburt... 2
Best collection dahlias, committee awarded first premium to H. B. Hulburt and Geo. Morgan..... —
Best collection cut verbenas, John Smith... 3
2d best, H. B. Hulburt... 2
Best collection cut roses, H. B. Hulburt... 3
Best collection fuchsias in pots, John Smith... 3
2d best, H. B. Hulburt... 2
Best collection geraniums, Geo. Morgan... 3
2d best, John Smith.. 2
Best specimen variegated plant, Geo. Morgan.. 1
Best hand boquet, Thos. Marshall, Painesville.. 2
Best parlor boquet, Mrs. M. Church, Painesville.. 2
Best display of asters, Mrs. N. Fitch, Concord... 2
Best specimen plant, in or out of bloom, Geo. Morgan....................................... 3
Best coxcombs amaranths, Mrs. N. Fitch, Concord.. 2
2d best, T. Jenkins, Cleveland... 1

REPORT OF COMMITTEE.

The display in this department is very superior, especially in variegated foliage plants. Far excelling, in the opinion of the committee, any previous exhibition.

W. H. BEAUMONT,
M. B. BATEHAM,
JOHN FLETCHER,
MRS. B. B. BARNEY.

FRUITS.

There were 72 entries of Apples, to which the following awards were made:

APPLES.

Best 10 varieties, not less than five each, J. A. Scott, Toledo	$5
2d best, J. Gallup, Cleveland	3
Do. 6 do. of apples, J. A. Scott	3
2d best, Miller, Swan & Layton, Springfield	2
Do. 6 do. of winter apples, Lewis Nicholson, Rockport	3
2d do. W. E. Mears & Co., Milford	2
Best arranged basket of 10 varieties, not less than half a bushel, J. A. Scott	3
2d best, M. B. Oviatt, Euclid	2
Best display in variety and quality, J. A. Scott	10
2d best, Ellwanger and Barry, Rochester, N. Y	5

AWARDING COMMITTEE.—Giles Boalt, Geo. Powers and D. Kreps.

ELLWANGER & BARRY—109 VARIETIES OF APPLES.

Summer.

American Summer Pearmain.
Astrachan Red.
Cole or Scarlet Perfume.
Early Strawberry.
Golden Sweeting.
Keswick Codling.
Summer Hagloe.
Summer Rose.
Summer Queen.
Bohannon.

Autumn.

Alexander.
Aut. Strawberry.
Cogswell.
Duchess of Oldenburg.
Fall Pippin.
Fall Russet.
Fleiner.
Fall Gennetting.
Fall Wine.
Gravenstein.
Hawthornden.
Hawley.
Jefferies.
Jewett's fine Red.
Lowell.
Maidens' Blush.
Munson Sweet.
Porter.
Pomme Royal.
Pumpkin Russet.
St. Lawrence.
Striped Sweet.
Menagera.
Parrot Reinette.
Gloria Mundi.
Tonne.
Gifford.
Kilham Hill.
Sawyer Sweet.

Winter.

Alfristan.
Baldwin.
Bellflower Yellow.
Bourassa.
Cardinal Red.
Dutch Mignonne.
Fallawalder.
Fameuse.
Jonathan.
King of Tompkins co.
King of Pippins.
Lyman's Pumpkin Sweet.
Lady Apple.
Monmouth Pippin.
Minister.
Mother.
Northern Spy.
Ortley.
Pryor Red.
Peach.
President.
Pomme Gris.
Rambo.
Reinette Canada.
Reine des Reinettes.
Rambourde Hiver.
R. I. Greening.
Ribston Pippin.
Russet Golden.
Russett Roxbury.
Swaar.
Seek-no-further.
Spitzenburg Esopus.
Smith's Cider.
Tolman's Sweet.
Twenty Ounce.
Vandervere.
Winter Pearmain.
Wormsley Pippin.
Wagener.
White Seek-no-further.
Tewksbury Winter Blush.
Camp.
Blenheim Pippin.
Sweet and Sour Greening.
Mannington Pearmain.

Detroit Red.
Monmead's Pearmain.
Sweet Rambo.
Reinette d' Anjou.
Marks.
Golden Reinette.
Beachemwell.
Scarlet Nonpareil.
Cornish Gilliflower.
Sweet Pearmain.
Belmont.
Rome Beauty.
Eustis.
Dumelow Seedling.
Reinette d'Or.
Ross Nonpareil.
Reinette Wortley.
Reinette de Bretagne.
Cooper.
Sanspareil.
Imperial.
Ashmead's Kernel.
Scarlet Pearmain.
Michael Henry Pippin.

Crab Apples.

Oblong Crab.
River's Large.
Large Red Siberian.

PEACHES.

In the class of Peaches and Pears there were 70 entries, to which the following awards were made:

Best 6 varieties, not less than 6 each, J. W. Doane, East Cleveland	$5
2d best, D. C. Richmond, Sandusky	3
Best 1 plate of 1 variety, not less than 6 specimens, E. Taylor, Cleveland	2
2d best, R. W. Hickox, Cleveland	1
Best and greatest display, Lewis Nicholson, Rockport	8
2d best, J. W. Doane, East Cleveland	5

PEARS.

Best 10 varieties, not less than 5 each, Geo. Morgan, Cleveland	$5
2d best, John Smith, Cleveland	3
Best 5 varieties, not less than 5 each, Miller, Swan & Layton, Springfield	3
2d best, E. S. Willard, Cleveland	2
Best 3 varieties, not less than 5 each, Miller, Swan & Layton, Springfield	3
2d best, L. Nicholson, Rockport	1
Best peck of 1 variety, J. Gallup, Cleveland	3
2d best L. Nicholson, Rockport	2
Best display in variety and quality, Ellwanger & Barry, Rochester, N. Y	10
2d best, Bateham, Hanford & Co	5

QUINCES.

Best 12 quinces, J. Gallup, Cleveland	$3
2d best, Miller, Swan & Layton, Springfield	2

PLUMS.

Best 3 varieties, not less than 6 each, Ellwanger & Barry, Rochester, N. Y	$3
Best plate of not less than 12 each, Ellwanger & Barry, Rochester, N. Y	2
Best display of plums, Ellwanger & Barry	—

AWARDING COMMITTEE—J. Austin Scott, T. P. Johnston, L. A. Hine and E. G. Willard.

ELLWANGER & BARRY—110 VARIETIES OF PEARS.

Summer.

Bartlett.
Buerre d'Amaulis.
Buerre Hamecher.
Bezi de Cassoi d'Ete.
Canandaigua.
Duchess d' Berri d'Ete.
Kingsessing.
Kirtland.
Livingston Virgalieu.
Moyamensing.
Muskingum.
Pinneo.
Summer Virgalieu.
Tyson.
Washington.

Autumn.

Buffam.
Buerre Bosc.
Buerre Diel.
Buerre d' Anjou.
Buerre Langelier.
Buerre Clairgeau.
Buerre Hardy.
Buerre Superfine.
Buerre Moire.
Buerre Brown.
Bergamot Gansels.
Belle Lucrative.
Ceter.
Comte de Paris.
Comte de Flanders.
Church.
Catinka.
Colmar Epine.
Chapman.
Buerre Mauxion.
Buerre Benoist Nouveau.
Comte de Lamy.
Cabot.
Dix.
Duchesse d'Angouleme.
Duchess d' Orleans.
Doyenne Boussock.
Doyenne Robin.
Doyenne White.
Doyenne Downing.
Doyenne Dillen.
Diller.
Delicis d'Aloist.
Earl's Seeding.
Elizabeth Edwards.
Frederika Bremer.
Flemish Beauty.
Fulvie Gregoire.
Figue de Naples.
Fleur de Neige.
Howell.
Henry IV.
Jalousie Fontenay Vendee.
Johannot.
Louise Bonne de Jersey.
Liberale.
Lodge.
McVean.
Marie Louise.
McKnight.
Napoleon.
Nantais.
Ontario.
Oliver's Russett.
Oswego Buerre.
Pratt.
Paradise d'Automne.
Paul Ambre.
Petre.
Rapaljes Seedling.
Serrurier.
Seckel.
Sheldon.
St. Andre.
Triumph de Jodoigne.
Tyler.
Urbaniste.
Van Buren.
Westcott.
Muscadine.

Winter Varieties.

Buerre Easter.
Buerre Gris de Hiver.
Black Worcester.
Belle Williams.
Alphonse Karr.
Doyenne Goubault.
Doyenne Siemelle.
Epine Dumas.
Easter Bergamot.
Figue de Alencon.
Felix de Leim.
Homewood.
Josephine de Malines.
Lawrence.
McLaughlin.
Passe Colmar.
Pound.
Pater Noster.
Rushmore.
St. Germain.
St. Princess.
Vicar of Winkfield.
Winter Nelis.
Willermoz.
Doyenne de Alencon.

First premium on display.

List of 35 varieties of Plums from Ellwanger & Barry, Rochester, N. Y.

Purple Gage.
Fellemberg.
Coes' Golden Drop.
Peter's Yellow Gage.
Lawson's Golden Gage.
Yellow Egg.
Lombard.
Madison.
Frost Gage.
Late Black Orleans.
Queen Mother.
Shropshire Damson.
German Prune.
Guthries' Aunt Ann.
Wine Sour.

Wuling's Superb.
Duanes Purple.
Imperial Gage.
Lucomb's Nonsuch.
Schenectady Catharine.
Roes' Autumn Gage.
Monroe Gage.
Dennison's Superb.
Lawrence's Favorite.
Reine Caude de Bary.
Drop d'Or.
Victoria.
Downton Imperatrice.
Smith's Orleans.
English Damson.
Shropshire.
Prune de Agen.
Topaz.
Pond's Seedling.
Orange.

CATALOGUE OF NATIVE FRUITS EXHIBITED AT STATE FAIR AT CLEVELAND.

The following is a list of native uncultivated fruits and nuts exhibited by E. J. Ferris, together with their common and botanical, names, &c.

COMMON NAMES.	BOTANIC NAMES.	REMARKS.
1. Alder, Black.	Ilex virticillata.	Tonic, astringent.
2. Alder, Tag.	Alnus Tirrulata.	Astringent, febrifuge, stomachic.
3. Apple, Crab.	Pyrus Coronaria.	
4. Ash, White.	Fraxinus acuminata.	Valuable timber tree.
5. Ash, Swamp.	Fraxinus juglandifolia.	do do
6. Arrow-wood.	Viburnum dentatum.	Astringent.
7. Bane-berry.	Actaea alba.	Acrid, caustic.
8. Basswood.	Tilia glabra.	Flowers secrete much honey.
9. Bittersweet.	Solanum dulcamara.	Fruit and herbage supposed poisonous.
10. Blackberry, high.	Rubus villosus.	Esculent.
11. Blackberry, running or swamp.	Rubus hispidus.	do
12. Blueberry.	Vaccinum angustifolium.	do
13. Burning bush.	Euonymus americanus.	Ornamental, Cathartic.
14. Button-bush.	Cephalanthus occidentalis.	
15. Buttonwood.	Platanus occidentalis.	Large tree, not very valuable.
16. Cherry. Choke.	Prunus serotina.	Astringent.
17. Cedar, Red.	Juniperus virginiana.	Timber durable, balsamic, stomach healing.
18. Cherry, Red.	Prunus obovata.	Astringent.
19. Cherry, Black.	Prunus virginiana.	Timber valuable, fruit edible.
20. Choke-berry, Red.	Aronia sanguinea.	Astringent.
21. Choke-berry, Black.	Aronia melanocarpa.	do
22. Cohosh, White.	Actaea alba.	Acrid, caustic, perhaps poisonous.
23. Cohosh, Blue.	Caulophyllem thalictroidea	Refrigerent.
24. Cornel, alternate leaved.	Cornus alternifolia.	Astringent.
25. Cranberry.	Vaccinium macrocarpon.	Esculent.
26. Currant.	Ribis floridum.	May be worth cultivating.
27. Cucumber tree.	Magnolia acuminata.	A pretty good timber tree.
28. Dewberry.	Rubus Canadensis.	Fruit esculent.
29. Dogwood.	Cornus florida.	Astringent.
30. Elder, common.	Sambuces Canadensis.	Emollient.
31. Elder, Red berried.	Sambucus pubens.	
32. Elder, Dwarf.	Aralia Spinosa.	Stimulant.
33. Fever, bush.	Laurus benzoin.	Aromatic, stomachic.
34. Ginsing.	Panax quinquefolia.	Stimulant.
35. Goose-berry.	Ribis lacustris.	Esculent.
36. Grape, Frost.	Vitis vulpina.	
37. Grape, Fox Ohio.	Vitis vulpina.	Found on the banks of the Chagrin river, as large as the Connecticut.
38. Green-brier.	Smilax rotundifolia.	Diuretic, and demulcent.
39. Ground Cherry.	Physalis viscosa.	Equal to the tomato for eating.
40. Hemlock.	Pinus Canadensis.	Ornamental, balsamic.
41. Honeysuckle.	Lonicera Ciliata.	Ornamental, fragrant.

CATALOGUE OF NATIVE FRUITS EXHIBITED AT STATE FAIR AT CLEVELAND, 1863—Continued.

COMMON NAMES.	BOTANIC NAMES.	REMARKS.
42. Honeysuckle, bush.	Diervilla trifida.	Fragrant.
43. Horse Gentian.	Triosteum perfoliatum.	Astringent.
44. Hackberry.	Celtis occidentalis.	Emollient, tonic.
45. Indian Cucumber root.	Gyromia virginica.	Weak tonic, root edible.
46. Indian Turnip.	Arum triphyllum.	Acrid.
47. Ivy, Poison.	Rhus toxicodendron.	Poisonous.
48. Jacob's Ladder.	Smilax peduncularis.	Diuretic, demulcent.
49. Judas Tree.	Cercis Canadensis.	Ornamental.
50. June-berry.	Aronia botryapium.	Fruit, edible.
51. Kentucky Coffee-tree.	Gymnocladus Canadensis.	Ornamental, timber said to be valuable.
52. Lilly of the Valley.	Convallaria borealis.	Diuretic, and demulcent.
53. Larch, American.	Larix Americana.	Balsamic.
54. Moonseed.	Minispermum Canadense.	Tonic.
55. Mandrake.	Podophyllum peltatum.	Cathartic.
56. Mountain Ash.	Sorbus Americana.	A dwarf variety, found in Burton Geauga county 40 years ago.
57. Mulberry.	Morus rubra.	Nutritious.
58. Paw-paw.	Porcelia triloba.	Fruit esculent.
59. Persimmon.	Diospyros virginiana.	Nutritious.
60. Partridge-berry.	Mitchella repens.	
61. Pine, White.	Pinus Strobus.	A very valuable timber tree.
62. Plum.	Prunus Americana.	Fruit esculent.
63. Poke-weed.	Phytolacca decandra.	Deabthuent.
64. Pipsissiwa.	Chimaphila umbellata.	Tonic, diuretic.
65. Pogonia.	Pogonia verticillata.	
66. Raspberry, Black.	Rubus occidentalis.	Esculent.
67. Raspberry, Red.	Rubus strigosus.	do
68. Sarsaparilla.	Aralia nudicaulis.	Stimulant.
69. Sassafras.	Laurus sassafras.	Aromatic.
70. Sheep-berry.	Viburnum lintago.	Fruit, esculent.
71. Solomon's Seal, Dwarf.	Convallaria bifolia.	Diuretic, and demulcent.
72. " Spiked.	Convallaria racemosa.	do do
73. Spikenard.	Aralia racemose.	Stimulent.
74. Strawberry.	Fragaria virginiana.	Fruit, esculent,
75. Sumach, Staghorn.	Rhus typhina.	Astringent.
76. Sumach, Smooth.	Rhus glabra.	do
77. Thorn Apple.	Crataegus punctata.	
78. Tulip Tree.	Lyriodendron tulipifera.	Valuable timber tree.
79. Wintergreen.	Gaultheria procumbens.	
80. Witch, Hazel,	Hamamelis virginica.	Diuretic.
81. Withe Rod.	Viburnum nudum.	Astringent.
82. Whortleberry, Squaw.	Vaccinium Stamineum.	Astringent, tonic.
83. Whortleberry, Black, upland.	Vaccinium racemosum.	Esculent.
84. Whortleberry, Black, swamp.	Vaccinium resinosum.	Esculent.
85. Whortleberry, Giant.	Vaccinium corymbosum.	Esculent.
86. Yam.	Dioscorea villosa,	Tonic.
87. Ground-nut.	Apios tuberosa.	May be much improved by cultivation.
88. Ground-nut.	Panax trifolia.	Stimulant.
89. Pea nut.	Amphicarpa monoica.	Nutritous, antiscorbutic, aperient.

LIST OF NUTS EXHIBITED AT THE STATE FAIR HELD IN CLEVELAND, 1862.

COMMON NAMES.	BOTANIC NAMES.	REMARKS.
1. Beech, American.	Fagus ferruginea.	Good for swine.
2. Beech, Water.	Carpinus Americana.	
3. Butternut.	Juglans cinera.	Esculent.
4. Black Walnut.	Juglans nigra.	do
5. Bladdernut.*	Staphylea trifolia.	Cathartic.
6. Chestnut.	Castanea visca.	Edible.
7. Groundnut.*	Apios tuberosa.	Edible, more valuable than the Chinese Yam.
8. Groundnut.*	Panax trifolia.	Stimulant.
9. Hickory, Shag-bark.	Carya alba.	Esculent.
10. Hickory, Thick Shell-bark.	Carya sulcata.	Esculent.
11. Hickory, Broom or Pig nut.	Carya glabra.	Esculent.
12. Hickory, Swamp or Bitter nut.	Carya amara.	Astringent.
13. Hasel-nut.	Corylus Americana.	Esculent.
14. Horse Chestnut.	Aesculus glabra.	
15. Iron-wood.	Ostrya virginica.	Astringent, febrifuge.
16. Oak, White.	Quercus alba.	Acorn, good swine food, valuable timber tree.
17. Oak, Over-cup.	Quercus macrocarpa.	do do do do
18. Oak, Quercitron.	Quercus tinctoria.	Bark valuable in tanning leather.
19. Oak, Red.	Quercus subra.	Of littile value.
20. Oak, Chestnut.	Quersus montana.	Bark used to tan upper leather.
21. Oak, Swamp White.	Quercus bicolor.	Acorns good, timber of some value.
22. Oak, Ink-ball.	Quercus coccinea.	Timber not of much value.
23. Oak, Pin.	Quercus palustrus.	Timber of some use, not very valuable:
24. Pea Nut.*	Amphicarpa monoica.	Nutritious, aperient.
25. Pecan Nut.	Carya olivaeformis.	Esculent.

* The two varieties of Ground-nuts and Pea-nut, also Bladder-nut, as they belong neither to the natural, or the *Juglandaceac*, nor *Cupulifua*, should not be placed among nuts I presume.

Professor Amos Eaton is my authority for the medicinal properties of the above. It is by no means a full collection of the fruits and nuts in Ohio.

E. J. FERRISS.
Little Mountain, Lake Co., Ohio.

GRAPES—HARDY.

There were 61 entries of grapes, to which the following awards were made:

Best 6 varieties not less than 4 bunches each, D. C. Richmond, Sandusky	$5
2d best, Geo. Morgan, Cleveland	3
Best 3 varieties not less than 6 bunches, Lewis Ford, East Cleveland	3
2d best, Daniel Stewart, Cleveland	2
Best display, not less than 10 varieties, 3 bunches each, G. W. Campbell, Delaware	10
2d best, E. Taylor	5

FOREIGN.

Best 3 varieties, 2 bunches each, T. Jenkins, Cleveland	4
Best bunch, A. W. Pond, Newburg	1

MELONS.

Best 6 musk-melons, any variety, J. W. Doane, East Cleveland........................ $2

RASPBERRIES.

Best quart of raspberries, G. H. Lodge, Cleveland.. $3
2d best, H. B. Lum, Sandusky.. 2
Best collection native uncultivated fruit, G. S. King, Madison, O........................ 5
Best collection native uncultivated nuts, M. B. Oviatt, Euclid........................ 5
Best peck of Ohio cranberries, E. J. Ferriss, Painesville........................ 5
Best peck of Ohio whortleberries, H. H. G. Smith, Toledo........................ 3

LIST OF HARDY NATIVE GRAPES EXHIBITED BY GEO. W. CAMPBELL, OF DELAWARE.

1. Delaware.	11. Raabe.	20. Rogers' Hybrid, No. 1.
2. Concord.	12. Clinton.	21. do do 2.
3. Rebecca.	13. Logan.	22. do do 3.
4. Maxatawney.	14. Anna.	23. do do 4.
5. Alvey.	15. Diana.	24. do do 5.
6. Louisa.	16. Perkins.	25. do do 9.
7. Lydia.	17. Allen's White Hybrid.	26. do do 13.
8. Oporto.	18. Cassady.	27. do do 15.
9. Cuyahoga.	19. Ontario.	28. do do 19.
10. Lenoir.		

FINE ARTS.

In the classes of Drawings, Paintings, Designs and Sculpture there were 93 entries, to which the following awards were made:

Best life size photograph, colored in oil by Ohio Artists, J. F. Ryder, Cleveland, Ohio..Silver Medal and $10
2d best, J. M. Green, Cleveland,..Diploma and 5
Best specimen of painting in oil, by American Artist, Miss C. L. Ranson, Cleveland...... 10
Best specimen uncolored photograph, J. F. Ryder, Cleveland....................Siver Medal.
2d best, J. M. Green, Cleveland..Diploma.
Best specimen daguerreotypes, J. F. Ryder....................................Silver Medal.
Best specimen of Ohio landscapes, in oil, by Ohio Artists, Geo. L. Clough........Silver Medal.
Best fancy painting, by Ohio or Foreign Artists, G. L. Clough........................ $10
Best specimen moss or lichen work, E. S. Hunt, Euclid........................Silver Medal.
Best specimen cone work, Mrs. R. P. Bowen, Cleveland........................Silver Medal.
Best leaf and flower work, Mrs. N. Fitch, Concord........................Silver Medal.
Best specimen of penmanship, Bryant & Stratton, Cleveland........................Diploma.
Best pen drawing, Bryant, Stratton & Felton..Diploma.

SCULPTURE, ETC.

Best collection and greatest variety of insects, H. Craig, Cleveland............Silver Medal.
Best collection and greatest variety of Ohio birds, prepared, H. Craig..........Silver Medal.

AWARDING COMMITTEE—S. J. Wadsworth, B. B. Barney, T. D. Page, M. J. Drake, Julia Butler, Frank Garlick, Geo. H. Adams and E. R. Tilden.

MUSICAL INSTRUMENTS.

In the class of Musical Instruments there were 6 entries, to which the following awards were made:

Best square piano, Geo. Hall, Ashtabula....................................Silver Medal.
Best Melodeon, Jewett & Goodman..Diploma.

AWARDING COMMITTEE—J. A. Harris, Wm. Hart and H. B. Spellman.

LIST OF ARTICLES COMMENDED AT STATE FAIR, 1863.

FIRST DEPARTMENT—LIVE STOCK.

CATTLE.

F. G. Pritchard, Brunswick, O., 3 steers at one birth, 3 years old.

HORSES.

Alonzo Hay, Chesterville, O., mare mule, 1 year old.

SHEEP.

Leicesters—Correll Merrell, Painesville, O., buck, 5 months old.
N. L. Chaffee, Jefferson, Shropshiredown buck.
Cotswolds—Thos. Aston, Elyria, O., one pen of 5 lambs.

CASHMERE GOATS.

S. S. Williams, Granville, O., pen of high grades.
W. D. Smith, Hebron, O., do

POULTRY.

E. Bingham, Cleveland, O., 1 pair Golden Pheasants.
A. Hall, do do Bolten Grays.
E. S. Stebbins, Newburgh, O., 1 coop do
Henry Bishop, Springfield, O., do Brahmas.
do do 1 pair White Shanghais.
Michal Rauber Cleveland, 1 coop Golden Pheasants.

SECOND DEPATMENT—MACHINERY, ENGINES, ETC.

MACHINERY, ENGINES, ETC.

Anderson & Co., Painesville, O., portable gage saw mill.
L. S. Fairchild, Cleveland, O., water wheel.
Anderson & Co., Painesville, O., saw hanging for muley saws.
H. H. Babcock, Watertown, N. Y., 4 engine pumps.
Jonathan Troop, Erie, Pa., self regulating wind power.
Chas. Wells, Cincinnati, O., job printing press.
Bostwick, Norwalk, O., windmill for sawing wood.
E. K. Wissell, Warren, O., spoke machine.
Frevor & Co., Lockport, N. Y., combined shingle and heading machine.
Wm. Kenyon, Steubenville, O., combined gas pipe cutter.

AGRICULTURAL MACHINES.

1st Division.—J. C. Birdsell, W. Henrietta, Monroe co., N. Y., combined clover thresher and huller.
Hollenshead, Morris & Co., Cincinnati, O., combined cider mill and corn sheller.
2d Division.—Chas. E. Miller, Amelia, O., combined roller crusher and seed sower.
Thos. Brett, Geneva, O., improvement in harvester seats.
H. B. Hammon, Bristolville, O., front weeding tooth.
F. F. Fowler, Upper Sandusky, O., hay hauling machine.
Chas. F. Dortenback, Cleveland, O., intestine cleaning and turning machine.
3d Division.—Wright & Holman, Springfield, O., hominy mill.
C. M. Stevenson, Eldersville, Washington co., Pa., combined rack and trough for feeding sheep.
Gates & Speer, Gates' Mills, O., 1 dozen hand rakes.
Daniel E. Smith, Adrian, Mich., stump extractor, (model).

TOOLS AND HOUSEHOLD IMPLEMENTS.

John Haye, Cleveland, O., 12 step ladders.
A. Schweizer, do scrubbing machine.
Richardson & Keeler, Sherman, N. Y., cream pot and strainer.
John A. Huff, Armanda, McComb co., Mich., Aldrich's patent fruit ladder.
Montgomery & Cook, Farmington, Wis., Strave's patent feed rack.
Wm. B. Munson, Independence, Cuyahoga co., O., fly fender.
Jacob Haller, Cleveland, O., burglars' alarm.
Roe & Blair, Madison, O., expansion cheese hoop.

PLOWS.

Rice, French & Co., Springfield, O., single shovel plow.

VEHICLES.

Cleveland Wood and Willow Cab Manufacturing Company, 3 wood cabs for children.
T. J. Body, Cleveland, O., 2 boys' sleighs.
do do 2 wheelbarrows.
do do 1 childs' cart.
C. L. Jones, do triangular spring brace.
Schreyer's, Columbus, O., pattern steel axle, or arm for wagon.
J. W. Fitch, Cleveland, O., top buggy.

Merts & Riddle, Ravenna, Ohio, display of carriage wheels, hubs, etc.
P. C. Stewart, Berea, O., display of felloes.

SEWING MACHINES.

D. M. Somerville, Cleveland, O., manufacturing machine exclusively for leather.

THIRD DEPARTMENT.

SILK FABRICS.

Geo. Levies, Cuyahoga Falls, O., 7 bales Oakum.

NEEDLE, SHELL AND WAX WORK.

E. Wyatt, Brooklyn, O., 1 silk quilt, composed of 6,000 pieces.
Louisa Harbaugh, Cleveland, O., patch work quilts.
Mrs. B. F. Dwelle, Elyria, O., white bed quilt.
Miss A. Carlisle, Cleveland, O., log cabin quilt.
Mr. A. C. Deveroux, do card embroidery.
Mrs. M. P. Wheelock, do case of millinery goods.
T. L. Wadsworth, do embroidery and machine work.
Alice Clark, Brooklyn, Cuyahoga co., O., crochet work.
Miss E. Craig, Cleveland, O., 1 case wax fruit.
Wm. Burger, do do

HOUSEHOLD FABRICKS.

Mrs. C. L. Dayton, Alden, N. Y., 10 yards flannel (Balmoral).
Mrs. J. M. Pero, Columbus, O., 1 gents' shirt.
Hattie M. Snyder, Cleveland, O., lamp stand mat.
Mrs. Geo. W. Billings, do double rim palm leaf hat.
Mrs. S. Newbury, do 1 knit shawl.
Asa W. Allen, Ellsworth, Mahoning co., 4 pair sheep skin mittens.
do do 2 dressed skins.
Mrs. Eliza J. Wiley, North Ridgeville, 1 feather bed.
Mrs. E. Ackley, East Rockport, O., down bed and pillows.
Chas. Uhlsch, Cleveland, O., woolen shoes.
Mrs. C. L. Dayton, Alden, N. Y., 1 pair linen stockings.
L. A. Keppner, Cleveland, O., 8 dozen collars.
Curtis Cramer, do 7 linen towels.

WORKED METALS.

Wm. Polyblank, Cleveland, O., display of tin ware.
King, Booths & Co., wood fence and iron posts.
Andrew Parke, Cleveland, O., 5 breech loading rifles.
R. W. Allen & Co., do sheet iron barrels for coal oil.
Quinn & Campbell, Hamilton, O., breech loading carbine.
O. P. Stevens, Cleveland, O., scraper attachment to shoe brush.
Wales Aldrich, do breech loading rifle.

STOVES, CASTINGS, ETC.

J. J. Low, Cleveland, O., Stewart's cooking stove, (wood).
J. E. Hall, do coal cooking stove.
Parish & Knight, do base burning parlor stove.

WOODEN WARE.

M. V. Craw, Cleveland, O., flour, pork and tight barrels.
H. A. Crosby, do display of shingles.
N. E. Lovejoy, do wooden eave troughs.
Henry Brown, Chagrin Falls, Cuyahoga co., O., percussion matches.
C. A. Richter, Cleveland, O., 2 faucets.
A. F. Newell, Warren, O., patent fruit boxes.

SADDLERS' AND SHOEMAKERS' WARE.

Smith & Dodd, Cleveland, O., 1 pair dress boots.
Griffin Brothers, Cleveland, boots and shoes.
Elias Shopell, Ashland, O., metalic boot and shoe pattern.

MISCELLANEOUS.

Isaac A. Isaacs, Cleveland, O., business suit of clothes.
do do military do
do do pilot cloth cape overcoat.
do do army trunk and bed combined.
Bishop & Co., do dress model.
J. W. Chidister, do port folio, paper holder, etc.
N. G. Smith, do 1 dozen brooms.
M. W. Pond, Elyria, O., patent trace buckle.
Pioneer Oil Works, Cleveland, O., refined petroleum oil.
Hussy & McBride, do lubricating coal oil.
M. C. Parker, do do
Hussy & McBride, do illuminating coal oil.
L. D. Palmer & Co., do double distilled petroleum oil.
Stove Polish Company, do stove polish.
John Frederick, do truss for hernia.
D. C. Smith, Adrian, Mich., truss.
T. G. Bristor, Cleveland, O., specimen of dentistry.
West Union Telegraph Company, Cleveland, O., telegraphic repeater.
H. Craig, Cleveland, O., case of microscopes.
Lightning Rod Company, Cleveland, O., lightning rods.
J. W. Penfield, Willoughby, O., drain tile.
Henry Craig, Cleveland, O., case of artificial eyes.
W. P. Fogg, do set of decorated China ware.
do do porcelain antique vase.
Thos. Bruton, New York, patent pipe and tobacco cases.
Mrs. Sarah Whipple, Cleveland, O., 3 loaves domestic bread.
Rose & Prentiss, do 6 hams, sugar cured.
Mrs O. L. Hinckley, Brooklyn, O., 10 pounds lard.
Hammon Stevens, Sheffield, O., bees wax.
Mrs. B. F. Dwelle, Port Clinton, O., dried currants.
Miss E. Minuse, Milan, O., pine apple preserves.
B. H. Bohmer, Cleveland, O., display of Aloes and Cactus, in pots, (Prof.
H. B. Hulburt, do specimen plant.
John Bock, do plate of Isabella grapes.
J. Eckers & J. Erwin, do do
T. Jenkins, do plate Cuyahoga grapes.
B. P. Bower, do 2 stuffed owls.

OPINIONS OF THE PRESS.

(From the Ohio Farmer.)

THE OHIO STATE FAIR.

The Fourteenth Annual Ohio State Fair opened on Tuesday of this week, with the weather fresh from the showers of the few days preceding. Our people are now so well settled upon a quiet war basis, that they had determined to go to the Fair, and they did go to the Fair: thirty thousand people, is a fair computation of the attendance on Thursday, which was the big day. Thirty thousand is a good many people—equal to thirty regiments of infantry, which occupy more space than they are generally estimated to fill, so that when you hear of a crowd of fifty thousand people, think of the vast proportions of a grand division of the army and revise your arithmetic: fifty thousand crowds of civilians are scarce, and five thousand are not plenty, even at Fairs. But this was a happy and a busy crowd, till the afternoon of Thursday, when there came on a sweeping rain which was better for the earth than the State Fair, but was awfully destructive of gaiters and bonnets; and awfully productive of a show of *matched calves*, which is in the agricultural line!

A reference to the list of awards following, will show who were the successful competitors in the several classes, but no mention which we have space to make, can do justice to the thousand and one articles of merit on exhibition. On the whole it was a good Fair and a large Fair, the receipts of money footing up some $15,000.

THE HORSE DEPARTMENT.

In the article of horses for useful purposes, this State Fair has seldom been excelled; but the most useful horses, like the most useful men, do not make the greatest display on public occasions. As usual, the horse ring was the centre of attraction for a large number of visitors, and whenever the exciting classes of horses were on trial, the excitable portion of the crowd were sure to pack the amphitheater and line the rails with a perfect park of tense humanity.

Thoroughbred Horses.—The contestants in this ring were "Col. Grayson," belonging to J. W. Fitch, of Cleveland; "Boston," and "Dan Webster," owned by Sam. Alexander, of Greene county; "Ben Butler," owned by Anderson & McMillan, of Greene county; "Young Grey Eagle," owned by Mr. Richardson of Cleveland; "Perfection," owned by Dan Law, of Willoughby; and Spangler's "Boston,"—a ring of handsome horseflesh. The red card was taken by "Col. Grayson;" and the blue by "Ben Butler." The verdict of the outsiders appeared to be in favor of reversing this arrangement—but "Ben Butler" is young, and can bide his time.

The *Roadster Ring* was a galaxy of noble form and display of excellent muscle. Old Hiatoga showed to a disadvantage in harness for want of training, but showed well enough to take the red ribbon. Excelsior did some of the fairest trotting that crowd ever saw—he always trots fair. St. Lawrence, the new $5,000 purchase of James M. Brown, is a stylish animal, combining the fine and the muscular, but was unfortunately suffering from a difficulty in his fore pasterns, which prevented him from being put to his speed.

The *Sweepstakes Ring* for stallions, brought out the force of the field, which was a goodly sight, wherein each animal was put upon his individual merits, whether of blood, muscle or perform-

ance. We have not space to particularize further in a class where all did well, and where to secure special attention, the winner must do *very* well.

THE CATTLE DEPARTMENT.

The famous old short horn breeders have abated somewhat of their old time ambition in the fitting up of herds for the ring, so that the show of cattle, though very fair, was not so heavy as it was a few years ago, especially when we had a large competition from Kentucky and Indiana. Never before on this continent was seen, and we fear never again shall we live to see, such a congregation of bovine beauties as were upon the grounds in Dayton, in 1860.

THE SHEEP DEPARTMENT.

Taken as a whole, the sheep department may be set down as first rate. Beginning at the north are the pens of the Southdowns, Shropshires, Cotswolds and Leicesters, from Judge Chaffee, of Ashtabula county. The Southdowns are of the stock purchased of J. C. Taylor, of New Jersey; the other from Mr. Miller, of Canada West, from English importations. Henry Friday, of Euclid, shows a very large Cotswold; John Chamberlain, of Lorain, several pens of Cotswolds, among which is an imported ram of most excellent proportions. Fat sheep, from L. G. Byington and E. Driggs, of Elyria, Leicesters, and further on, nice store sheep from the same exhibiters. Wm. Pinchcumbe, of Cuyahoga, two Leicesters; then come the pens of Southdowns from Samuel Toms, of Elyria—as neat and symmetrical as if they had been turned in a lathe. Thos. Bennington, of Laporte, three pens of large Southdowns; John Whitlam, of Cuyahoga, three pens of Southdowns, from stock bred by Samuel Toms. Wm. Leuty, of Cuyahoga, Leicesters, from Raw Jackson stock, and a pen of Cotswolds. William Squires, Copopa, very likely Cotswolds from stock imported and bred by Mr. Stone, of Guelph, C. W. James Leuty, of Cuyahoga, fat Leicesters. Ed. Davis, Royalton, very large Downs, weighing over 300 lbs. each; clip 12 lbs. wool; sold at 60 cts. C. Merrill, Lake county, very large and handsome Leicesters; Charles Button, Medina county, Merinos; Wm. Kennedy, Brunswick, very wooly lambs. Then came a range of pens of Merinos from Vermont, with sheep for sale, some of excellent quality, and so on down. The owners were Messrs. Karr, Foot, Hill and Wright. Thos. Gorby, of Portage county, with the fine wool prize buck, Hannibal, and his worthy fellows, were a great center of attraction. Robert Perrine, of Washington county, Penn., stoutly contested the palm with Mr. Gorby, in this line, with a lot of very nice sheep. J. S. Delano, of Mt. Vernon, who is entering the lists as a breeder of fine-wool sheep, has a start in the right direction; J. W. Worcester, of Pittsfield, has the pick of a flock well known to fame; John Duncan, of Sidney, has two pens of good fine wools; and James Lester, of Avon, closes the range with a lot of heavy Leicesters.

Along side of the wooly people, were the Goats called Cashmere, which everybody crowded up to see and admire. It is time these animals were correctly named, as they are the real Angora and not the Cashmere goat, which latter would be of little service in this country, while the Angora promises to be very profitable.

SWINE.

Large breeds of hogs were well represented by George Anderson and Martin Carroll, of Painesville, who are inveterate prize takers. J. H. Perrine, of Lebannon, and Andrew Caton, of Morrow county, also exhibited some good hogs. Of small breeds, Samuel Toms, of Elyria, had the best animals.

POULTRY.

Since the Shanghai fever died out, this department of our Fairs has never been very full. The main exhibiter this year was Henry Bishop, an "American citizen of African descent,"

of Springfield, who had quite a handsome variety of fowls, including some black bantams, whose "cunning" looks charmed the money out of "Kirk's" pocket for a pair. Mr. Tubbs, of this city, had a pair of his bronze Turkies on show. J. W. Taylor, of Seville, exhibited a pair of "Guilford chickens;" and M. Baker exhibited some fine silver and golden pheasants. The whole display was reasonably good, and what it lacked in numbers was made up in constant "crowing."

MECHANICAL DEPARTMENT.

Among the machinery for farm purposes, the sorghum mills and evaporators attracted a large share of attention. We have described and illustrated the machinery business so fully in the *Ohio Farmer* this season, that we shall omit a repetition of that branch, at this time. Several new inventions were on the ground which we will illustrate as we have opportunity.

FARM AND DAIRY PRODUCTS.

In this department we found friend H. P. Canon, of Twinsburgh, as Superintendent—a happy selection, but *he* was not happy on Tuesday evening; his tables were not filling up fast enough. But all this changed on Wednesday, and as the cheese and butter, and vegetables, and everything in his line, crowded in upon him, his face shortened up with a smile that denoted contentment. The united testimony is, that this department was vastly ahead of the exhibition of last year.

The Dairy products were specially notable. Several of the most noted cheese manufacturers of the Reserve furnished specimens. The average weight of each cheese was over 130 pounds, and one mammoth from E. C. Cox weighed over 350. Butter was also displayed in profusion.

Of farm products, the display was not extra large, but the variety was good, as well as the quality. We have no room to speak at length—and can only say that the display in this hall was better than last year, but yet not up to the mark which it should reach in this State of rich soils and good farms.

FRUIT HALL.

This department was under the superintendence of Geo. W. Campbell, the grape man of Delaware, as well as *the* "Delaware" grape man, who was himself the most liberal exhibiter in that line, having on the tables 28 varieties of native grapes. The number of exhibiters of fruit was small, but the few who contributed in this department did so liberally. Among the largest exhibiters were Messrs. Ellwanger & Barry, of Rochester, N. Y., who showed upon the tables 109 varieties of apples, 110 varieties of pears, and 35 varieties of plums. J. Austin Scott, of Toledo, who exhibited 116 varieties of apples; Messrs. Bateham, Hanford & Co., of Columbus, who presented over 70 varieties of pears; Lewis Nicholson, of Rockport, who had a fine show of peaches and apples; Messrs. Miller, Swan & Layton, of Springfield, who were liberal exhibiters of apples and pears; J. Gallup, of Cleveland, who had the only display of quinces, as well as apples; and Messrs. Robennet & Son, of Bedford, who made a fine display of apples. R. N. Andrews, of Rootstown, F. G. Lewis, of Rockport, M. D. Oviatt, of Euclid, Mrs. R. Hawkins, of Rockport, and T. S. King, of Lake county, made fine shows of apples. The display of apples was much superior to that of peaches. Of the latter the show was limited in quantity, and not extra in quality. Dr. Taylor, of Coyedale Nursery, and Lewis Nicholson, of Rockport, were the main exhibiters of this fruit.

The time was not favorable for a large show of grapes, yet many of the varieties in this portion of the State were exhibited in variety. As already mentioned, Geo. W. Campbell, of Delaware, had 28 varieties, D. C. Richmond, of Sandusky, had 9 varieties, L. Nicholson had 9 varieties, E. S. Willard had several varieties, as had also Lewis Ford, of East Cleveland, and various others of this region. Nothing in Fruit Hall attracted the attention of visitors so much

as six splendid bunches of Black Hamburg grapes, presented by A. W. Pond, of the Newburg Asylum. They were of unusual weight of bunch and size of berry.

T. S. King, of Lake county, Thos. Bushnell, of Ashland, and M. B. Oviatt, of Euclid, made each a display of uncultivated fruits and nuts; and J. D. Herrick, of Ashtabula, presented a collection of Ohio woods and plants.

We confess to a shade of disappointment at the exhibition of fruits. In variety and quality the State of Ohio was not fairly represented.

FLORAL HALL.

There was no feature of the Fair that attracted more attention than that of Floral Hall. The amateur florists of this region determined that this exhibition should excel anything of the kind heretofore seen in Ohio, and they succeeded in their determination. Under the superintendence of J. Kirkpatrick, of this city, the Hall was tastefully decorated with evergreens, and the plants and flowers arranged with artistic skill. From the collections of H. B. Hulburt, Joseph Perkins, and A Stone, of this city, was presented a large array of rare and beautiful greenhouse plants. Mr. B. H. Bohmer, of Cleveland, also exhibited many greenhouse plants, and a beautiful collection of fifty seedling verbenas raised by him. Messrs. Bateham, Hanford, & Co., of Columbus, were also liberal exhibiters of plants. Of cut flowers, the show was very attractive. The main exhibiters in this line were Messrs. McIntosh & Co., of this city, Peter Herker, of East Cleveland, Mrs. Henry Wick, &c. Among the boquets and floral ornaments, we noticed, as all visitors did, some fine boquets from Mrs. L. Marshall, of Painesville, and boquets and hanging baskets from Mrs. N. Fitch, of Concord, Lake county.

The State Fair will travel for some time, and seek several locations, before it will present its visitors such another rare and beautiful assortment of plants and flowers, or a floral hall so attractive in all its features.

FINE ARTS HALL.

Under the superintendence of Mr. Hopkins, and with the assistance of the artists, and others of Cleveland, the Fine Arts Hall was rendered very attractive. The first thing to attract the eye of the visitor upon entering the building was the display of all sizes and styles of photographs from the gallery of J. F. Ryder, of this city, including some colored in the highest style of the art. Mr. R.'s pictures were not prepared specially for this occasion, but were such as he executes every day at his rooms on Superior street. Turning to the left from his collection, the eye fell upon life-size and life-like portraits of Dr. J. P. Kirtland, John Brough, and J. R. Giddings, surrounded by a collection of other oil paintings, all from the studio of Miss C. L. Ransom, of Cleveland. To the right and left of these were displayed drawings and paintings by amateurs, and beautiful specimens of cone and moss work, in the shape of picture frames and baskets, the handiwork of ladies. Among these was a very handsome cone frame and picture by Mrs J. H. Sargent, of Cleveland, and cone and moss work by Miss Forress, of Painesville, Miss Weston, of Warrensville, Mrs. Hurst, of Elyria, and others. Messrs. Bryant, Stratton & Felton, of the Cleveland Commercial College, exhibited speciments of penmanship by their teachers and scholars. H. Craig, and the Messrs. Singer, exhibited their collections of insects, shells, and butterflies, as did Mrs. Milford a collection of butterflies. T. Y. Gardner exhibited plaster medallions of the Rev. Dr. Aiken and Rev. Mr. Goodrich, which were handsome works of art.

In the centre of the Hall were several melodeons manufactured in Cleveland by Messrs. Jewett & Goodman, and some pianos.

Next to the Floral Hall, the Fine Arts Hall was the most complete feature of the Fair.

HALL OF "INDUSTRY."

Around this little building, where the "little busy bee" was teaching its lesson of industry to lazy men, a constant throng of visitors was crowding—the noted Bee men, W. A. Flanders,

of Shelby, and E. Corner, of Columbus, being the centre of attraction; the former showing outsiders how to "charm" the honey-makers, and how to work them in his patent hive,—and the latter urging upon the crowd the merits of his bee-hive. The music of the occasion was not lessened by the action of a little cross-grained bee that refused to be charmed even by the elo quence of Prof. Flanders, and therefore with laughable audacity pricked the Professor's elo_ quent tongue. But he rebuked him, by selling all the more of his charm.

SPECIAL MENTION.

A new roofing.—Our friend Zadoc Street, of Salem, O., had on exhibition a new combination for roofing, that he has just invented. His process commences with the manufacture of slating tile of brick clay, that are about an inch thick, perhaps six inches wide and ten inches long. These are laid on the roof sheeting in a coating of plaster cement, which secures them to the roof, and also cements the joint so perfectly that the tile will break before the joint can be separated. The tiles are laid so as to break joints similar to a brick pavement. Upon the tile roofing is spread a coating made of flax seed oil, Spanish whiting and dissolved gutta percha, and the whole coated with sand. Another mode of covering the tiles is to use coal tar and sand. By this combination of the plaster cement, the clay tile, and the outer coating of the mixture of oil, whiting, gutta percha and sand, the inventor claims that he obtains a roof which is light, will exhibit no openings by shrinkage, will resist the action of heat as well as water, is free from all the objections which have led to the discarding of nearly all patent roofings, and finally, is 25 per cent. cheaper than tin. Mr. Street has also obtained a patent for a machine for making the tile, by which they can be turned out at the rate of 1,000 per hour. If this new roofing possesses the merits claimed for it by the inventor—and he has tested it upon his own buildings in Salem without its exhibiting any defects—it will take the place of the tin and other modes of dispensing with shingles. As we understand him, the public will soon have the opportunity of testing it.

Visitors from Pennsylvania.—Among the visitors at the Fair was a delegation of the officers of the Allegheny county (Pa.) Agricultural Society. We are glad of the opportunity of making the acquaintance of such intelligent gentlemen as Messrs. Geo. G. Negley and Samuel Kennedy. The former is the uncle of that gallant officer and noble patriot, Gen. James S. Negley, formerly a correspondent of the Ohio Farmer, and now one of Gen. Rosecrans' most reliable Division Generals. Our Pennsylvania friends were greatly delighted at the magnificent show in all departments of the Fair, as well as at the vast concourse of people.

Drain Tile Machine.—We regret that our friend, A. La Tourette, of Waterloo, New York, was disappointed in not receiving his Drain Tile Machine in time for exhibition at the Fair. This machine was recently illustrated in the Ohio Farmer, and wherever exhibited attracts great attention. It is now crowding all other Drain Tile Machines to the wall.

The Searcher stock of horses proved their title to popularity on this occasion, and Mr. Lamb may well be satisfied with the result of the exhibition. Old Searcher, as sire of the best five colts, and his rival son, Champion Searcher, are most esteemed were they are best known.

Ben Butler, the young Scythian horse, belonging to Daniel McMillan and B. D. Anderson, of Xenia, turned the tables upon his venerable competitor, Col. Grayson, in the sweepstakes ring for stallions, and bore off the red.

Sheep Sale.—Hon. T. C. Jones, of the State Board, and his neighbor, F. P. Vergon, of Delaware, purchased some fine prize Leicester ewes of John Chamberlain, which were brought by that veteran sheep breeder from Canada West.

(From the Daily Morning Cleveland Herald, September 16, 1863.)

FIRST DAY—TUESDAY MORNING.

The Fourteenth Annual Fair of the Ohio State Board of Agriculture opened this morning under the most favorable auspices. The weather is warm and delightful, the sky clear,

the road good, and everything as propitious for a successful exhibition as could possibly be desired.

At an early hour this morning people from the surrounding country began to arrive with loads of articles intended for exhibition. The trains also brought large numbers, and the people of the city were astir, sending in their contributions. The Secretary's office was opened at six o'clock, and from that time every window was beseiged with exhibiters making entries, and the clerks found it impossible to keep pace with the demands on them. At the present rate with which exhibiters are reporting themselves, it will be impossible to get all the entries made to-day. We do not know the exact number of entries made up to noon, but they were largely in excess of last year's up to the same time. In Roots and Vegetables there are 175 entries, showing that the farming and gardening interests will be well represented.

The display of Horses and Cattle will exceed that of last year, and it is thought by those qualified to judge, that the display of fine animals in both those classes will be superior to anything yet presented in the State. Some magnificent cattle are on the grounds, and a large number of choice horses. In Sheep there is an unusually fine display—some excellent specimens being on the grounds. This feature of the Fair will attract considerable attention among our wool growers and wool dealers. In Swine and Poultry there is promise of a fine display.

The different halls are beginning rapidly to fill up, and will present a very fine appearance before evening. Among the articles already in Mechanic Hall we noticed a full display of baths, washstand fittings, and other specimens of plumbing, from the establishment of B. P. Bower. Some fine specimens of refined Petroleum Oil from the Pioneer Oil Works; Brushes, made by the pupils of the Industrial School; Wooden Eave Troughs, from N. E. Lovejoy & Co., and other articles are among the Cleveland manufactures already in this Hall.

Agricultural Implement Hall is filling up with a large collection of every kind of farming implements; the contributions of Baldwin, De Witt & Co., and Dormer & Nolte, of this city, being prominent among them.

In the Hall for Farm Products, the most noticeable among the contributions already in the Hall, are a couple of Cotton Plants from Southern Illinois. These will attract considerable attention. They were brought here by Mr. N. C. Meeker, Southwestern correspondent of the Chicago *Tribune*, and formerly of this county. The plants are strong and hardy and stand from three to four feet high. The cotton is growing on them in all stages from the blossom to the ripe blow. The larger of the two plants was raised by E. Leavenworth, Dongola, Union co., Ill., who has eight acres under cultivation. The other plant was raised by J. L. Freeze, Anna, Union co., Ill., who has ten acres under cultivation. The cotton is of good quality and readily brings, at home, ten cents a pound cash, in the seed.

Mr. Meeker says there are from twenty to thirty thousand acres of Cotton growing in Southern Illinois, most of which has been uninjured by the late frost. Between the 37th and 38th degrees of latitude, the cotton, though late, is doing well.

In the same hall there are a number of boxes of Cheese, from the famous Carter and Bartlett dairies.

Fine Art Hall is filling up very much quicker than it did last year, and the display is already very fine. Miss Ransom has a fine collection of oil paintings. S. C. Groune has a number of oil painted photographs and landscapes, painted by Geo. L. Clough, that will attract attention. Among them are a large painting of H. B. Castle and family, and two very well executed views, one representing a ship-yard on the Old River Bed, and a view of Cleveland from a short distance up the canal. J. F. Ryder is unpacking a large lot of fine photographs to fill his space. W. P. Fogg contributes a full assortment of costly China, fine lamps, statuary, China ornaments, etc. A very curious and interesting collection of prepared insects, frogs, birds and shells has been placed on the left of the entrance, by Henry Craig, and next to them is a fine case of butterflies and moths, prepared by Theodore and Gustave Singer.

For the convenience of exhibiters and information of the public we give the following names of superintendents of the respective departments and halls:

Horses, Hiram Lewis; Cattle, R. N. Jones; Farm Products, H. P. Cannon; Farm Implements, R. B. Walker; Floral, John Kirkpatrick; Fine Arts, G. W. Campbell; Mechanics, M. A. Brown.

Leland's band is mounted over Mould's Central Ice Cream Hall, and has been playing lively airs all day. Mould himself, and his multitude of assistants, have been "as busy as nailors," preparing for feeding the multitude that are "marching along" toward the Fair grounds, and everything betokens that the Fair will be in every way a "big thing."

AFTERNOON.

The promise of the morning was well supported in the afternoon.

The number of visitors was larger than at any previous "first day," and the rush of entries continued until the closing of the office, leaving a large number to be entered on Wednesday morning. Over two thousand entries had been made up to five o'clock in the afternoon.

The cattle entries numbered 118, of which 61 were thoroughbreds.

Of horses there were 288 entries, of which 120 were matched horses and mares, 14 thoroughbreds, 36 roadsters, 63 horses for general purposes, 7 draft horses, 33 sweepstakes, and 15 jacks and mules.

There were 140 entries of sheep—the Vermont breeders having a large proportion, and 11 entries of Cashmere goats.

In machinery, agricultural machines, tools and household implements, there were 212 entries; whilst in articles of manufacture, trade and domestic, there were 450 entries. Nineteen sewing and knitting machines have been entered.

In the farm and garden products there is a satisfactory list of entries, and more to follow. At present they stand as follows: Field crops, 9; flour and grain, 52; cheese, 10; butter, bread, etc., 58; honey, preserves, etc., 164; sugar, 27; vegetables and roots, 287.

The lists in flowers, fruits and fine arts, were equally satisfactory.

Among the articles brought to Mechanic Hall since the forenoon, were two enormous masses of Chippewa coal—one furnished by L. Crawford & Son, and the other by J. Morris & Price. They were fitting specimens of the great staples of Ohio.

Another feature was the display of refined oils and lubricating oils, from the works of Morehouse & Merriam, Pioneer Oil Works, Hussy & McBride, and M. C. Parker, all of Cleveland. Belonging to the same feature were the coal oil barrels of R. N. Allen & Co., with metalic heads and bungs. These are also a Cleveland manufacture.

The churn question seems to be one of considerable interest, judging from the great number of different kinds of churns on exhibition. Every one of the churns was claimed to be the very best churn in existence, and warranted to make butter in less time than any other churn. We expect to see some of them make butter in less than no time, and some others attempt to beat that.

Among the farm products we noticed a curiosity in the shape of some stalks and heads of "Japan Wheat," entered by Peter Howk, of East Cleveland. It is a strong plant, with a very heavy head, or rather cluster, crowded with small grains. It is claimed to yield two hundred bushels to the acre.

Floral Hall is already a fairy bower, and presents the finest show of rare and beautiful plants ever exhibited at an Ohio State Fair, and the contributions are not all brought in yet. The east wing is occupied with a fine collection from the gardens and green-houses of Mr. Joseph Perkins; the west wing is filled with the contributions of Mr. H. B. Hurlbut; the north wing is occupied by Mr. Amasa Stone, jr., and Mr. Bohmer, and the south wing by contributions from the Case green-houses. The centre stand is filled with a choice and beautiful collection of ferns. We shall describe this hall more fully when contributions are all in.

Fruit Hall will be filled with an abundant and rich display. Already the tables are well

covered with apples, pears, peaches and grapes, and the contributions to this department have only began to arrive. The Rochester nurseries have sent large numbers of apples and pears. There will be a fine show of grapes. The noticeable of the lots already arrived are six mammoth bunches of Black Hamburgh Grapes, raised at Newburgh Lunatic Asylum, and entered by the Steward, Mr. Poe. They are monstrous bunches. Dr. Edward Taylor, of the Covedale nurseries, Cleveland, sends in twenty-three varieties of grapes, as follows: Catawba, Clinton, Delaware, Diana, Garrigeus, E. N. Muscadine, Hartford Prolific, Herbemon, Hyde's Eliza, Logan, Isabella, Marion, Mary Ann, Perkins, Monmouth Union Village Blood-red, Venango, Northern White, Spurious Diana, Tokalon, Essenburg and Cuyahoga.

The first day has closed with better prospects of a brilliant success than has attended the first day of any previous State Fair. If the fine weather continues, as it promises to do at present, it will be a grand success.

The city is already crowded with people, and the visitors on the second day of the Fair will evidently be very numerous.

SECOND DAY—WEDNESDAY MORNING.

The second day of the Fair opened with splendid weather, and early in the morning the crowd of visitors commenced moving up from the city toward the Fair Grounds. The cars of both the street railroads running that direction were loaded down with people, and on Kinsman street an endless stream of carriages, omnibuses, and wagons plying for hire, shrouded themselves and the pedestrians in blinding dust. Inside the grounds the crowd thickened rapidly, and soon the different Halls became so crowded that it was very difficult to get a near view of the articles. All the Halls have been considerably filled up since last evening, and now present a splendid appearance. We reserve a more particular description of the articles in the Halls until our next issue.

HORSES.

There is a very fine show in the different classes of Horses. Among the Thoroughbreds we noticed a fine stallion, "Boston," a five year old, entered by S. Alexander, Jamestown, Green county, O. It is out of Boston, jr., and is a fine looking animal. The same owner enters Dan. Webster, a seven year old. The well known stallion, "Col. Grayson," now twelve years old, is entered by J. W. Fitch, A four year old stallion, "Ben Butler," out of "Scythian," is entered by Anderson & McMillan, Xenia. John Tod, Cleveland, enters two mares, "Grace Tod" and "Sallie Tod," which have made a fine show at other Fairs. They are respectively three and two years old.

Among the Roadsters there are a number of splendid horses. J. T. and D. B. Updegraff, Mount Pleasant, Jefferson county, enter two fine stallions, "Flying Hiatoga," a ten year old, which has become deservedly famous, and which, in the combined qualities of speed, adaptability to all purposes, endurance and style, can hardly be equaled. A half-brother, "Dan Rice," also ten years old, although not quite so showy, is a horse of splendid qualities.

Mr. James M. Brown, of Massillon, enters "Young St. Lawrence," a brown stallion of considerable beauty and good blood. It is a six year old, and has already raised a number of colts of great value, taking principally after the "Messenger" style, "Young St. Lawrence" being descended from old "St. Lawrence" and "Messenger." This horse is an elegant animal, handsomely limbed, and full of good points.

Mr. Hosmer, of Troy, Geauga county, enters "Yankee Lady," a fast trotting mare out of "Yankee Blade," and related to the Sykes horse.

Two horses from the celebrated "Backus" stallion, have been entered by —— Ebelthwait, of Cleveland. They are "Backus," 15 years old, and "Young Backus," 6 years old. They have all the principal features of their celebrated progenitor.

R. H. Keith, Geneva, Ashtabula county, enters "Simcoe Chief," out of "Wildair," and a descendent of "Black Hawk." It is a fine horse.

A fine black gelding, "Black Boy," that is not unknown in trotting circles, is entered by Fuller, from near Columbus. It is attended by a colored groom, who said the horse did not feel at all aggrieved by its name.

Fuller & Simpson, of Brooklyn, enter a very showy Sykes colt, two years old.

M. P. Venage, of Butler county, enters a good horse, "Belmont."

A mare that attracts considerable attention is, 'Hambletonian, jr.," raised in Orange county, N. Y., and now owned in Meadville, Pa. She is half sister to the celebrated "Fillingham," and partakes of its leading characteristics.

Among the Cleveland roadsters entered besides those mentioned, we find a 7 year old gelding, "Frank Leslie," entered by John Martin; "Lady Forrest," a 2 year old mare, by George Howlett; a brood mare and colt by W. J. Waterson; a 3 year old mare, "Kitty Gurley," by W. D. Waddle; a 3 year old mare "Jewess," by H. C. McDowell; an 8 year old mare, "Buckskin," John Martin; a stallion by G. B. Senter; and one stallion, "Henry Clay," by L. C. Tibbitts & Co.

AFTERNOON.

The crowd in the afternoon was still greater than it was in the forenoon, making the Halls uncomfortably full. The large size of the grounds gave ample breathing and moving room for all that chose to come.

The programme for the afternoon comprised the exhibition of thoroughbred and roadster horses, also work oxen and steers, fat cattle and milch cows, jacks, jennies and mules. The display in all these classes was very fine, the entries being numerous, and the quality of the stock above the usual standard.

The show of Thoroughbred Horses was good, and the competition close. The first premium was awarded to J. W. Fitch's well known stallion "Col. Grayson," which has taken the premium at several Fairs previously. This fine animal is so well known here that no particular description is necessary. The premium was well bestowed. Anderson & McMillan, Xenia, took the second premium on their four year old "Ben Butler." In the other classes exhibited, the judges have not yet made their returns.

CATTLE.

The number of entries of cattle was large, and the quality of the stock exhibited unusually good. Experienced judges say that at no previous State Fair had the quality averaged so well. A large number of splendid Durham cattle were on the grounds. The entries of thoroughbreds of all kinds, reached the remarkable number of 62, among them being as fine cattle as ever graced a stall.

E. Driggs, of Elyria, exhibibited 10 fine animals; D. McMillan, jr., Xenia, had 11 entries; C. W. Clark, Springfield, O., 7 entries, among them being the Durham bulls "New Years Day" and "Gladiator," which have taken several premiums. The Durham bull "Bernard," a 6 year old, which took the first premium at the State Fair in Sandusky, was entered by C. P. Irwin, of Huron county. Among the fat cattle were a cow and an ox, exhibited by James Langhorn, of Cleveland. R. Baker, of Avon; G. Byington, of Elyria; E. G. Pritchard, of Brunswick, Medina co.; G. S. King, of Medina; Jacob Powell, Reynoldsburgh; J. W. Glover, West Liberty, O., W. H. Palmer, Fayette county; W. N. Farr, of Medina, and others, whose names we did not ascertain, have fine cattle on exhibition. Mr. Pritchard has three fine steers, all at one birth, and now 2 years old, that attracted much attention. Two yoke of Buffalo, entered by J. L. Kelsey, attract considerable attention, from their novelty here. They are rather small animals, and are said to be well broke and useful for driving. They will be exhibited in the horse ring on Friday.

SHEEP.

The entries of sheep are fully as numerous as last year, whilst the quality is much better. Of Saxons there are no specimens entered, and of Silesians but three. Leicesters number 17; Cotswolds, 12; Southdown and fat sheep, 32; whilst Merinos number 83, that being decidedly the favorite class at the present Fair. The Vermont sheep raisers are on hand as usual. Messrs Ira S. & L. J. Wright, of Weybridge; J. C. Hill, of Cornwallis; S. D. Carr A. K. Carr, of Shoreham, representing Vermont by numerous pens of Merinos. Most of the Vermont Merinos will be sold in this State after the Fair.

Among the Cotswolds on exhibition, are some fine ones, by Thomas Aston, of Elyria; Wm. Squires, of Copopa, Lorain co.; N. L. Chaffee, of Jefferson, and Henry Priday, of Euclid. Elyria sent several fine specimens of Southdowns and fat sheep.

The following premiums were awarded last evening on four of the classes of sheep. Merinos have not yet been reported on:

Silesians—First premiums were awarded to the following: Robert Perrine, Patterson's Mills, Pa., best buck, 2 years old; Carey & Starr, Carey, O., best 5 ewes, 2 years old; H. J. Starr, Carey, O., 5 ewes, 1 year old. The committee said they did not make the awards in consequence of any particular excellence in the sheep, but rather in consideration of the fact that, in their opinion, they are a class of sheep likely to be wanted.

Leicesters—John Chamberlain, Avon, best buck, 2 years old; same, best buck, 1 year old; same, best 5 ewes, 2 years old; same, best 5 ewes, 1 year old; same, best 5 lambs, 5 months old. The committee recommended that the breed be encouraged on account of their wool, but especially on account of their mutton, they being a class of sheep that readily fatten.

Cotswold—Best buck, 2 years old and over, N. L. Chaffee, Jefferson, O., weight 365 pounds; best buck, under 2 years, W. Squires, Copopa, Lorain co., weight 307 pounds; best pen of 5 ewes, over 2 years old, Thomas Aston, Elyria; best pen of 5 ewes, under 2 years old, Thomas Aston, Elyria. A pen of 5 lambs, sent by Thomas Aston, Elyria, was commended as worthy of premiums, but there was no competition.

Southdown and Fat Sheep—First premiums were awarded to N. L. Chaffee, Jefferson, best 2 year old buck, Samuel Toms, Elyria, O., best 1 year old buck; same, best 5 ewes, 2 years old; John Whitham, Barry P. O., best 5 lambs, 5 months old; E. Driggs, Elyria, best 5 fat ewes; J. Leuty, Gates' Mills, second best; Romante N. Anderson, Rootstown, Portage co., best fat sheep; E. Driggs, Elyria, best pen of five fat lambs. There were twelve entries of Cashmere goats, among them being some from S. S. Williams, Licking co., and also a couple contributed by S. N. Sanford, of the Cleveland Female Institute.

SWINE.

The entries of swine have not been very numerous. Fifty-seven entries in all have been made, the large breeds being the most numerous. The principal exhibiters are Andrew Oatin, Cardington; George Anderson, Painesville; Martin Carroll, Painesville; A. P. Leland, Newburgh; Thomas Bennington, La Porte; Cyrus Laroe, Wyandsville, Cuyahoga co.; Samuel Toms, Elyria; Henry Priday, Euclid.

POULTRY.

There were 68 entries of poultry, among them being a number of fine specimens of all the varieties of fowls, ducks, and other domestic feathered bibeds. The principal exhibiters are A. A. Jewett, A. Hall and Wm. Fox, Cleveland, and Henry Bishop, Springfield, O.

FLORAL HALL.

The centre of attraction for a large proportion of visitors, especially ladies, was Floral Hall. This building is in the shape of a cross, with arms of equal length, and, under the management

of Mr. J. Kirpatrick, it had been tastefully and elegantly ornamented with evergreens and moss. The tables were filled with plants and flowers of the rarest and most beautiful kind, and the central platform was filled with graceful ferns and lycopodiums, from the collection of H. P. Hurlbut.

Practical gardeners and judges of flowers, who have attended previous State Fairs, assure us that no previous Fair could compete with this one in the shape of flowers and rare and beautiful plants. The hall was completely filled, and presented a charming and attractive appearance to the crowds of spectators who crowded it during the day.

Geo. Morgan, gardener to Mr. Joseph Perkins, Cleveland, exhibited a large and splendid collection of plants and flowers, embracing an extensive variety. Among them were aloes and cactus, geraniums, gloxiana, verbenas, petunias, ferns and lycopodiums, variegated leaf plants, boquets and cut flowers.

John Smith, Cleveland, exhibited a large collection of verbenas, cut dahlias, fuchsias and variegated leaf plants.

H. B. Hulburt, besides the ferns and lycopodiums in the centre platform, exhibited a large and beautiful collection of stove and green-house plants, gloxianas, verbenas, petunias, dahlias, roses, fuchsias, etc.

B. H. Bohmer, Columbus, had a large collection of green-house plants, of various kinds, and among the cut flowers a collection of fifty varieties of seedling verbenas, raised by himself.

M. Hagerty, Cleveland, exhibits a variety of geraniums, azaleas, cut flowers, etc. Peter Herker, East Cleveland, contributes fuchsias, asters, and other flowers. McIntosh & Co., Cleveland, has a fine show of cut dahlias G. J. Proback, Cleveland, has some pretty baskets of flowers. Mrs. Henry Wick has a collection of asters and amaranths. J. P. Fletcher, Cleveland, has a considerable display of cut dahlias and verbenas.

Among the boquets and floral ornaments, are moss wreaths, a basket of flowers, and a house made with moss and flowers, by Miss Louisa Schress, of Cleveland; a number of boquets by Thos. Marshall, of Painesville; a fine parlor boquet from the gardens of Deacon Sked; floral ornaments, boquets and hanging baskets of flowers, by Mrs. N. Fitch, Concord, Lake county; and a rustic stand with flowers, by P. Herker, East Cleveland.

FRUITS.

Fruit Hall presents a very respectable show of apples, pears, peaches, and grapes. Of apples, there were 150 entries. The largest contributions of apples and pears were from Mount Hope Nurseries, Rochester, N. Y., and Cooper Nurseries, Springfield, O. A large number of very fine plates of apples and pears were included in both those collections. Among the other larger collections of apples we noticed those of M. B. Oviatt, of Euclid, R. M. Andrews, Rootstown, F. G. Lewis, Rockport, J. Gallup, Cleveland, A. Robennet & Son, Bedford, J. A. Scott, Toledo.

A curiosity among the apple contributions was a collection of about 50 twin apples. We could not ascertain by whom they were entered.

Some fine quinces, entered by J. Gallup, Cleveland, we noticed with the red card (1st premium) on them.

The display of peaches was fair, but not extra fine. We noticed red cards on a plate of peaches entered by E. Taylor, Newburgh, and on a display of peaches by Lewis Nicholson, East Rockport.

There were 61 entries of grapes and wines. Morris B. Oviatt, Euclid, exhibited three varieties, E. L. Sturtevant, East Cleveland, exhibited three verieties, A. W. Pond, Steward of the Newburgh Lunatic Asylum, exhibited six splendid bunches of Black Hamburgh grapes, that we have already noticed. They took a first premium. R. H. Knight, Dover, exhibited 3 varieties of grapes; S. N. Sanford had a specimen of a new seedling grape; Lewis Nicholson, East Rockport, had 9 varieties; John Beck exhibited a plate of Isabellas; G. W. Campbell, Delaware, had a display of hardy grapes; E. S. Willard exhibited 3 varieties; A. W. Pond, of Newburgh,

and H. H. G. Smith, Toledo, each exhibited foreign grapes; D. C. Richmond, Sandusky, had 9 varieties of grapes; Lewis Ford, of East Cleveland, George Morgan, gardener for Joseph Perkins, Esq., Bateham, Hanford, & Co., of Columbus, and S. Jenkins, Cleveland, each had fine specimens of grapes.

Among the wines were specimens of Catawba, Isabella, Raspberry, and Currant, from G. H. Lodge, Cleveland, Currant wine from Miss Mollie Babcock, Brooklyn. Various berry wines from W. Tomlin, Cleveland.

Speaking of drinkables, we may mention here that John M. Hughes exhibits samples of his bottled Ale and Porter; S. O. Saylor samples of Sands' Chicago Ale; and C. C. Rodger's three dozen bottles of his ales.

There are in this Hall three full collections of native and uncultivated fruits, berries, and nuts, that to many persons are not the least interesting portions of the display in the Hall. They are furnished by Morris B. Oviatt, Euclid, Thos. Bushnell, Haysville, Ashland county, and F. S. King, Madison, Lake county.

FINE ART HALL.

We have already mentioned several of the principal features of the Fine Art Hall.

The walls are covered with choice specimens of art and skill, amongst which it is difficult to particularize which is the best. J. F. Ryder has a large and very fine display of Photographs, of all sizes and styles. Among them are many of well known citizens, that are of life like resemblance to the originals. Some beautiful colored photographs are also exhibited by Ryder. None of the pictures have been got up with reference to the Fair, but are such as he ordinarily takes.

J. M. Greene exhibits some very fine photographs, plain and colored, among them being some splendidly painted in oil, by G. L. Clough. The latter artist also exhibits some fine oil paintings, to which we have already called attention. North has some good plain photographs, and some colored by Schwerdo.

Mrs. C. E. Ransom's studio furnishes several oil paintings, among them being a large portrait of John Brough, and also the masterly portraits of Hon. J. R. Giddings and Dr. Kirtland.

Among the amatuer drawings and paintings are two water colored paintings by J. L. Pope; a pen drawing by Julia A. Wilson, Cleveland; oil paintings and India ink picture by Mrs. C. P. Chapman; Crayon drawing by J. B. F. Walker, Cleveland; pencil drawing by R. H. Knight, Dover; S. N. Sanford exhibits three oil paintings.

Miss Louisa Harbaugh has a pencil drawing medley picture and cone basket; Mrs. B. P. Bower, cone work; Miss Phila H. Dickenson, Cleveland, frame cone work; Miss Lida Weston, Warrensville, cone work and floral ornament; Miss Mollie Babcock, Brooklyn, needle picture and cone frame; Mrs. G. J. Probac, two Birch bark picture frames; Miss C. Conness, Painesville, moss work and cone work; Miss. Matilda Barton, Cleveland, cone frames and basket; E. S. Hurst, Euclid, cone and moss work; Mrs. A. C. Deveraux, Cleveland, photographic views and moss work; Mrs. J. H. Sargent, Cleveland, cone frame and picture.

T. Y. Gardner exhibits the medallions of Rev. Messrs. Aiken and Goodrich, which have been on exhibition in Sargent's window. B. P. Bower has two fine owls, stuffed. The insects, shell, and butterfly collections of H. Craig and T. G. Singer, we have already noticed. Mrs. M. Milford has a collection of butterflies. A collection of old newspapers by H. M. Hall, is in the same building.

Jewett and Goodman, of this city, contribute several melodeons of their manufacture. Bryant, Stratton, and Felton, of the Commercial College, exhibit several specimens of the penmanship of their students, which attract great attention. This admirable institution for educating young men, a thorough practical business education, is now in a highly flourishing condition, and receives the support and confidence of our business community. We do not doubt that the present Fair will add greatly to the prosperity of the college, by directing the attention of hun-

dreds to the great advantages offered by it to young men who wish to win a position in the business world.

FOURTH DAY—FRIDAY MORNING.

Was there ever a State Fair without rain? We don't believe there ever was. The oldest inhabitant would exercise his memory in vain to recall the event. But of all State Fair rains that of last night would undoubtedly take the premium. All night long the deluge continued. Talk of raining cats and dogs, and pitchforks with their points downward—those descriptions fall far short of the facts. Language has not words to depict the avalanch of waters that poured down upon the city last night. This morning nature appeared with its face washed, but not wiped, and looked like a small boy that had been blubbering and washing at the same time.

The weather in the morning was chilly and drizzling, in fact, anything but pleasant, and very unpromising for the last day of the Fair. But a considerable number of people began early to go out to the grounds, and thousands of others watched the sky and hoped for a change of weather.

The weather continued cold and disagreeable all the forenoon, materially interfering with the receipts from visitors, and hindering the proper carrying out of the programme of exhibitions.

AFTERNOON.

The weather in the afternoon was cold, gloomy, wet and unpleasant, so that the attendance was very much smaller than it would have been had the fine weather continued. As it was there was a fair number present.

There were four entries for trotting stallions, "Honest Bill," by S. Finch, Burton; a stallion by Philo Thompson, of Trumbull co.; "Dan Rice," by J. T. & D. B. Updegraff, of Mt. Pleasant; "Kennebec," by G. S. Shipman, Norwalk. The result of a sharp contest was the awarding of the first premium to the Trumbull county horse—time, 3:01¼; and the second premium to "Dan Rice"—time, 3:02.

From trotting mares and geldings there were four regular entries: "Tom Morgan," by Van Loon, of Worthington; Ed. Russell, mare, of this city; a gelding, by Hiram Roe, of North Bloomfield, and a mare, Laura, by J. T. Updegraff. A sorrel mare was brought into the ring by J. H. Taylor, Medina, who claimed that the entry had been made upon the Secretary's book, but having lost his card, it had not been entered upon the committee's book. The judges allowed the mare to trot, with the understanding that if the name was not found on the Secretary's books the claim should not be allowed.

The result of the race was that the Medina mare made the distance in 3:06, Van Loon's gelding in 3:11¼, and Updegraff's mare in 3:16. An examination of the Secretary's books showed that the Medina mare had not been entered for competition, and the premium was therefore awarded to the gelding.

Whilst on the subject of horses, we must notice the fact that the premium on matched roadsters was awarded to Col. J. P. Ross, of the Angier House, for his beautiful bay mares "Village Maid" and "Sallie Hill." They are an exceedingly handsome pair, and the premium was generally conceded to them. The sorrel horse "Frank," and bay mare "Maggie," belonging to Wm. Edwards, took the second premium.

The premium on family horse or mare, was awarded to the mare belonging to Col. Anson Stager, Superintendent of Telegraphs. It is, without exception, the best broke in, and every way most desirable family horse we ever saw.

"*Revenons a nos moutons*:" The trotting in the afternoon was wound up by the "Kansas Buffaloes," which made pretty good time around the ring and attracted considerable attention.

As soon as the ring was cleared, the four steam fire engines, belonging to the Fire Department, entered and proceeded in procession around the ring, to the gratification of a number of strangers, who saw those engines for the first time. Unfortunately, in starting, after a halt, the jerk broke the connecting braces attaching the machine to the forward wheels, and let the front of the engine down, but without injuring it. The iron of the brace was defective, although it was impossible to discover it before the accident. As it was, it was fortunate the break occured when and where it did. Had it happened in running down hill to a fire, the result would have been disastrous. The injury is slight and will be repaired at once.

By this time the hour of closing the fair had arrived, and the exhibiters commenced removing their articles. The Forest City Band, which had been playing the last two days of the Fair—Leland's having played on the first two days—struck up a farewell tune, the shivering spectators hurried homewards, and the Fair was over, after two days of midsummer weather, and one day of decidedly winterish cast.

Great interest was manifested in the sugar and evaporators, and the feeling between the rival proprietors was at fever heat. A new candidate for popular favor appeared in the "Victor Mill," of the Clark Sorgho Machine Company, of Cincinnati, which, by dispensing with the "dumb return" obviates all danger of choking, and serves about one-third of the power. After a careful examination, the committee awarded the first premium to the Victor Mill.

The Cook Evaporator, with Mr. Cook's new cellular attachment, received the first premium among the evaporators, both mill and evaporators having been entered by Blymyer, Bates & Day, of Mansfield, O.

Among the premiums awarded to Clevelanders, we noticed that J. F. Ryder swept the board in the photographic department, taking five first premiums, on oil life size photographs, uncolored photographs, India ink photographs, and daguerreotypes. The collection was a very fine one, but no finer than can always be found in his rooms, which makes the fact of receiving so many premiums more valuable. In connection with this, it is proper to remark that some of the colored photographs were painted by Miss Cleveland. That of Lieut. Col. Pickands was noticeable for the appropriate scenery and surroundings introduced, which is somewhat of a new feature here.

J. M. Greene had some very fine photographs, plain and colored, which took second premiums. Mr. G. L. Clough, who paints Mr. Green's photographs, received premiums for some handsome oil painted landscapes. Miss Ransom also received premiums for her oil paintings. Bryant, Stratton & Felton took two premiums—one for a specimen of penmanship, and the other for a pen drawing. The penmanship of that establishment, like their whole system of commercial education, is always "first premium," and very many of their pupils are receiving the premium in the shape of valuable engagements by business houses.

Smith, Dodd & Co., were also among the fortunate ones, who swept off the premiums. Their boots, shoes, and other fixings, took the red card, right and left.

The Fair is over and has proved every way a success, in spite of the miserable weather of the closing day. This success is largely due to the ability, energy and foresightedness of the Secretary, Mr. J. H. Klippart, a man whom no ill omens appall and no obstacles retard. He proves in his connection with the State Board of Agriculture that "there is no such word as fail."

The assistants in the Secretary's office, and the various superintendents are also deserving of much credit for their successful labors. The Superintendent of the Police Department, City Marshal Frazee, with his aid, Chief Engineer J. A. Craw, and his able corps of detectives and police, rendered immense service in preserving admirable order and protecting persons and property. There were no disturbances in or around the grounds, and the city throughout was never more free from disturbance or theft.

The feeding and refreshment arrangements of Mr. W. R. Mould, are deserving of all praise. The immense crowd was promptly supplied, with an unlimited quanity of provisions and drinkables, and we did not hear a single complaint or murmur of dissatisfaction. The universal verdict seemed to be that W. R. Mould "*can* keep a hotel," whenever he choses to go into that line of business, which reminds us of the fact, that his supper and lunch rooms, at the old "corner of Euclid street and Public Square," are in full operation, with oysters, game, and all the other fixings to order.

ABSTRACTS OF REPORTS OF COUNTY SOCIETIES.

ASHLAND COUNTY.

This Society was organised on the 1st Saturday in June, A. D. 1863, at the Court House, in Ashland, under the provisions of a resolution, passed by the State Board of Agriculture, at a meeting held at Cleveland, April 28th, A. D. 1863. At the time of its organization it numbered one hundred and nineteen members, who had paid their membership fee of one dollar for the current year. Afterwards, and during the time of holding the annual Fair, the number of members was increased to one hundred and eighty-four. The first annual Fair was held on the 7th, 8th and 9th of October. The first day of the Fair was a day of continuous rain. The morning of the second day opened with favorable weather, and entries were made until the afternoon of that day. Notwithstanding the unfavorable weather at the opening, the entries were unusually large, amounting, in all the departments to six hundred and thirty. Of these entries 116 were horses; 62 cattle; 39 sheep; jacks and mules, 7; swine, 5; farm implements, 14; flour and grain, 17; fruit, 34; vegetables, 47; bread, butter and cheese, 32; harness, 5; boots and shoes, 9; cabinet ware, 40; domestic manufactures, 26; poultry, 10; ornamental work, 22; green house plants, 16; field crops, 4; and miscellaneous 125. The morning of the 9th again opened with rain, and although the afternoon was fine, yet the unfavorable morning materially lessened the receipts.

The principal crops of the county are wheat, corn, rye, barley and oats. Taking the assessor's return of the crop of 1862 as a basis, and estimating the number of acres cultivated in wheat at one-fifth less, for the season of 1863, owing to the scarcity of laborers, would give 22,287 acres; estimating the average yield per acre at 12 bushels, would make the amount raised 267,444 bushels. Corn, 15,287 acres; average yield per acre, 20 bushels; total, 305,740 bushels. Oats, 323,340 acres; average yield 30 bushels. Buckwheat crop about a total failure. The principal cause of injury to the wheat was "freezing out." Injury to the corn, frosts of August and September.

The prospects of the Society are more flattering than were those of the old society at any previous period.

ATHENS COUNTY.

The Annual Fair of the Society was held on the 24th and 25th of September, 1863, with an increased attendance and display of stock and articles in the various halls, over the former year.

In view of the state of the country, and the anxiety and excitement attendant thereon, as well as the fact that we have sent a large proportion of our able bodied men to the army, and thus weakened the department of agriculture at home, we may consider our last Fair a success, and an evidence of the prosperity and usefulness of the Society.

Our Society numbers three hundred and fifteen members.

There is a very large increase this year in the growing of the sorghum cane; perhaps nearly or quite 50 per cent. There is also an increase in flax growing and hay.

ASHTABULA COUNTY.

The Ashtabula County Agricultural Society held its Seventeenth Annual Fair at Jefferson, September 2d, 3d and 4th, 1863. The weather was fine, and the attendance good. The number of members for the year, 144. The number of the different articles entered for competition reached 769. Notwithstanding the time for holding the Fair was deemed by many too early in the season, the show was fine in nearly every department. The show of cattle was not as large as it has sometimes been in former years, as quite a large number of our farmers are devoting more attention to the breeding of sheep. However, there were some fine specimens of the improved breeds of cattle on exhibition.

The show of sheep was large, among which were to be found representatives of nearly every breed at present deemed worthy the attention of the farmer. The Spanish Merino, the Southdown, the Leicester and the Cotswold are becoming the favorite breeds among our farmers, and each has its advocates as possessing some one or more desirable qualities than can be found in the others. These several breeds were largely represented at our last Fair, and such was the high intrinsic quality of the animals shown in these several classes, that our farmers might feel a just pride in the rapid progress of the last few years in the efforts to add value to the sheep stock of the county.

A few samples of the Shropshire Downs were also on exhibition, from the farm of Hon. N. L. Chaffee, which were regarded with favor by the farmers, but they have not been tested here sufficiently long to determine how well they are adapted to our soil and climate, or how profitable they may be in comparison with the other breeds more common to our county.

In nearly every department of farm production there is an evident spirit of progress, as is evidenced by the improved quality of products exhibited at our annual Fairs. More of our farmers are interesting themselves in the objects of the Society, and labor more generally in unison with the Board of Officers to increase the interest in the Society, and extend its usefulness.

For several years the Society has been burdened with a heavy debt, incurred in the purchase of grounds and the erection of large halls for exhibition, but this debt is now nearly extinguished, and the future looks hopeful.

BELMONT COUNTY.

The interest taken in our fairs for the past two or three years has not been so satisfactory as formerly, which fact is shown by a falling off of the amount of receipts and members as compared with some of our former exhibitions. This fact, however, is not attributable to any diminished interest in the rural districts, or any want of interest in our annual exhibitions, but mainly on account of the disturbed state of the country. Since the breaking out of the rebellion everything seems to have become so unsettled that many of our people "know not what to do." Indeed it has been a question of much discussion with many of our farmers and mechanics, as to whether it would not be better to suspend the holding of our Annual Fair till things connected with the state of the country become more settled.

The Society held its Fifteenth Annual Fair on their grounds, on the 22d, 23d and 24th days of September, 1863. The exhibition in the leading departments, especially in the wool-growing interest, was good; but in some other branches of the exhibition it did not meet the expectations of the managers.

In the exhibition of animals, although not so numerous as at some of our former exhibitions, it was a goodly representation as to quality, consisting of some very good horses, Durhams, grade Devons and some excellent specimens of native breeds of cattle, an evidence that our farmers and stock men have profited by the deep interest heretofore taken in the improvement of the different breeds of our domestic animals.

The great interest taken in the wool-growing part of our community, has, for the past two or

three years, made it a leading business, and with some has become quite a mania for improvement in animals of the "ovine race." There has been purchased the past season some Spanish bucks, at prices ranging from one hundred to five hundred dollars per head; and it is believed that more attention is being paid to the sheep husbandry now than at any former period in our country.

The show of articles in the several halls of the exhibition was perhaps more fully represented, particularly that part under the immediate control of the ladies—proof that they are indefatigable in catering for the tastes of "epicures" in the luxuries of the table, as well as the other comforts of the inner man.

The number of members for the year 1863 is 210.

BROWN COUNTY.

Our annual fair for 1863 was held on the 8th, 9th, 10th and 11th of September, at the Society's grounds (Georgetown). In consequence of the disturbed condition of our country, and especially on our border, and the consequent arrival of large bodies of troops to defend it, which from necessity had to be quartered on our grounds, our fair last year was a failure. It was not without many misgivings as to success this year that the friends of this enterprise commenced preparation. But silently and perseveringly they labored, and the result was a complete success. The first two days the attendance was small and appearances rather discouraging, but the last two days the attendance was unusually large, and the marked good order in so large an assembly gave unmistakable evidence of the deep interest felt by all present.

The number of horses on exhibition was large, and of a quality not easily surpassed. The number of cattle, sheep, &c., was not so large, but in quality gave conclusive evidence of an onward march in improvement; and in fact the same may be said of every department in farm products. The Hall, which is large, was well filled, but too much praise cannot be bestowed upon the ladies, for their skill, industry and fine taste exhibited on the display in the domestic manufactures and floral departments, making the Hall, as it should be, a place of great attraction. In short, our fair of 1863 was a decided success, giving well grounded assurance of future prosperity.

This year will nearly relieve us from a heavy debt, incurred previously for large improvements, which will enable our Society, in a pecuniary point of view, to add additional inducements in the future.

BUTLER COUNTY.

The thirteenth annual fair of the Butler county Agricultural Society, was held on the 6th, 7th, 8th and 9th days of October. On the two first days of the fair it rained almost incessantly, which operated very much against the Society, so far as pecuniary matters were at stake, and to some extent it was a draw-back in all the apartments of the exhibition. The amount of receipts from all sources was twenty-six hundred and fifty-nine dollars and sixty-two cents. Fifteen hundred and ninety dollars of said amount was for membership cards at one dollar each. The whole amount of the expenditures was twenty-six hundred and five dollars and ninety-seven cents. Fifteen hundred and eighty-one dollars of said amount was paid for premiums, leaving a balance on the credit side of the account of fifty-three dollars and sixty-five cents, which added to the balance on hand last year, make a balance in the Treasury of over twenty-four hundred dollars, which amount, or at least a great portion

of it, will be expended the coming season in building a floral hall, which is much needed; and any balance, together with anticipated receipts next year, will enable the Board of Directors to offer still more liberal premiums than heretofore. The competition in all of the departments was good, and in some extra good. In the Sheep department particularly, the number was large and the quality extra. Our county has been advancing rapidly in the sheep business, and the Board offered premiums on three different grades, amounting to thirty-four dollars for each grade, dividing the premiums into first, second and third, which arrangement proved very satisfactory to exhibiters. The same grade of premiums was adopted on hogs; also on many articles in the other departments, and met with general approbation among the exhibiters. The display of green fruit was extra for our county. As a general thing our county is rather behind in the fruit business, but from the exhibition last fall feel in hopes that she will redeem her character in that particular branch. The great attraction of the fair was Floral Hall. The ladies were there and had their handiwork with them. There was scarcely anything you could think of in the shape of fancy, ornamental and useful work but what was on exhibition. The ladies were the recipients of some four hundred dollars of premiums. The only department that was deficient was that of Cattle. Our county has always been behind in the rearing of cattle. Our premium list on cattle has been rather less than it should have been; at least small in comparison with some other things, all things considered, which I have no doubt will be attended to hereafter. Under all the circumstances I am happy in stating that our last fair was a decided success.

CARROLL COUNTY.

The Carroll county Agricultural Society held its thirteenth annual fair on the fair grounds at Carrollton, on the 7th, 8th, 9th and 10th days of October, 1863.

Many of the most enterprising farmers and stock men of the county feared that the peculiar state of the country would render the holding of a successful fair impossible. The amount of interest taken in military matters, and the deeply exciting political canvass that was sweeping over the State, seemed to give very reasonable grounds for their fears. But as the time drew near for holding our fair the prospect seemed quite flattering, and had it not been for the inclemency of the weather, our fair this year would, from all indications, have been second to none ever held in the county. The attendance was not as large as common; neither was the number of entries as large.

The Floral Hall department, on account of the continued rain and the lateness of the season, was but poorly represented.

The horse department was quite lively, and there seems to be quite an interest taken in raising fine horses.

The wool growers of our county are making great efforts to improve both the quality of their wool and sheep. Spanish merinoes are deemed by most the most profitable, and the great increase in the amount of wool raised, show that sheep raising and wool growing are soon to be the principal occupation of the farmers of Carroll county.

Nothing new in agricultural implements to report. Crops are generally short this year on account of the drouth. Fruit rather scarce and not of a very good quality.

There were no statements of competitors for premiums on crops and other improvements in agriculture, &c.

The society has not been in a flourishing condition for several years. During the year 1862 no Fair was held by the society, and this year it rained every day of the Fair, thereby putting quite a "damper" on it.

The number of members at present is 159. The officers are still determined to make another effort to raise the condition of the Agricultural Society of this county to what it was some years ago. They may fail, but not without an effort.

Wheat, corn, oats, rye, flax-seed, and barley, are the principal grains raised in this county; more meadow land than formerly on account of the increased number of sheep.

The following is an estimate of the number of acres sown, amount raised, and average yield per acre of grain for the year 1863 in Carroll county, Ohio.

	Wheat.	Corn.	Rye.	Oats.	Barley.	Flax-seed	Meadow lands
Acres sown.........	18,000	10,000	3,000	12,000	400	3,000	25,000
Bushels raised.....	216,000	00,000	30,000	300,000	8,000	....	25,000 t'ns hay
Average per acre...	12	30	10	25	20	....	1 ton.

The past season was not a favorable one, the great drouth during the months of July and August rendered it quite difficult to get sufficient pasture for the stock, much of which in consequence, was driven to the West. Hay was and is very scarce, bringing often 20 dollars per ton. Insects did very little injury to the crops. The locusts appeared in this county this year, and inflicted considerable injury on all kinds of trees. The potatoe crop was very light, on account of the drouth, but what potatoes did grow are very sound, and of excellent quality. Quite a light crop of all kinds of fruit.

CHAMPAIGN COUNTY.

The thirteenth annual Fair of the Champaign County Agricultural Society was held on the 29th and 30th days of September, and the 1st and 2d days of October, 1863.

The premium list, and rules for the government of the Fair, was published on the 1st of May, giving "all concerned" five months to acquaint themselves with what they had to depend upon, as fixed facts, and we find that a strict enforcement of the adopted rules (which some object to) gives general satisfaction, and proves beneficial to the best interests of the society.

The number of entries was 1347, the amount of premiums awarded was $851 00; the premiums were all paid in cash, save that a rule requiring "all premiums to be called for within thirty days;" $30 00 of the awards were forfeited to the society.

The articles which attract the most attention, and in which a great and growing interest has sprung up, are, horses, sheep, fruit, grain, vegetables, and the entire department of the ladies; while cattle, swine, mechanic's wares, agricultural implements, and fine arts, receive very little attention. All efforts to improve these very important departments have failed.

The number of enrolled members for 1863 is 750.

The principal crops raised in the county are wheat, corn, rye, oats and potatoes.

CLARK COUNTY.

The Clark County Agricultural Society held their eleventh annual Fair on the ground of the society, at Springfield, on the 6th, 7th, 8th, and 9th days of October, 1863.

The attendance was not so great as usual, owing to the very unfavorable state of the weather, though the exhibition was in all respects very successful.

There is a manifest improvement in the Horse and Sheep stock of the county, whilst the exhibition of fine cattle is not so great as a few years since.

The principal crops raised in the county are wheat, corn, hay, barley, and oats. Owing to the early part of the summer, being dry and cool, our crops are not equal to the average, and a severe frost in August seriously injured a great part of the corn crop. Average of wheat, 14

bushels; corn, 36 bushels; hay, 1 ton; barley 30 bushels; oats, 30 bushels. There was considerable flax grown for the seed; average 10 bushels.

The receipts of the Fair were $1,531 25; premiums paid, $936 00.

CLINTON COUNTY.

The annual exhibition of the Clinton County Agricultural Society for the year 1863, was held on their Fair Grounds, near Wilmington, on the 9th, 10th, and 11th days of September. We are gratified to report that the exhibition in all the departments has not been surpassed by any since the organization of the society. The receipts were sufficient to pay largely increased premiums, and liquidate all indebtedness against the society, and leave a balance in the treasury.

We have no statements of competitors for premiums on crops or improvements in agriculture to report. The principal crops raised in this county are wheat, corn, oats, and potatoes. We estimate the amount of wheat raised in our county in the year 1863 at 370,000 bushels, and the average yield per acre 13 bushels; the amount of corn, 1,729,244 bushels; average, 41 bushels per acre; the amount of oats, 150,000 bushels; average yield, 20 bushels per acre; the amount of potatoes, 45,706; average yield per acre, 45 bushels. We had 9,437 acres of meadow and 13,025 tons of hay. In addition to the above named crops, we raised a fair crop of rye, barley, buckwheat and sorghum. Our corn crop was not an average one, in consequence of the drouth and early frosts. The cause of the partial failure of our wheat crop was the dry weather in the Fall when sown, also injured to some extent by the weevil and the fly, which are the most destructive insects to the wheat in our county.

CLERMONT COUNTY.

The Clermont County Agricultural Society held its fifteenth annual Fair at Olive Branch on the 1st, 2d, 3d, and 4th days of September, 1863.

Owing to the unpropitious circumstances entirely beyond the control or foresight of the managers, our Fair financially was not a success. These circumstances were the appointment of a "District Military Drill," by the State authorities, an "Association" by the Baptist Church, and "Mass Meetings" by each of the political parties of our county, all on the same week of the Fair, and in our immediate vicinity.

The exhibition itself was a good one, reflecting great credit not only upon the enterprising managers, but upon the farmers and mechanics who contributed to the exhibition, as usual on such occasions. The ladies come in for a liberal share of the credit due our exhibition.

The stock department was well represented, and gave evidence of the increased attention paid to the improvement of horses, cattle, mules, sheep and hogs.

Floral Hall, as heretofore, was the great centre of attraction at this Fair, and well did it deserve the praises bestowed upon it by the admiring visitors. The display of fruits was the largest and most varied ever made in the county, and would have been no discredit to a State exhibition.

Needle and shell work, the products of the pantry and loom, reflected much credit upon the ingenious and industrious exhibiters, and attracted unusual praise from the few delighted visitors in attendance.

The society, with all its discouragements, has great reason to be hopeful. We think no agricultural district in the State can show more substantial evidences of successful farming than Clermont county. The number of members to our society is 322.

COLUMBIANA COUNTY.

The annual fair of the Columbiana county Agricultural Society was held on the fair grounds at New Lisbon, September 23d, 24th and 25th, 1863. The weather for the most part was favorable, and the number of entries and members very creditable, especially under the circumstances of another drouth and the distracted state of our country. But we still look forward to a time when our fair may claim more of the attention of the farmers and mechanics of the county than it has for the past few years.

The number of members this year was and number of entries about 800. There were but two entries for field crops, that of Wm. Kemble for best two acres of corn, taking premium, amount of shelled corn per acre by measure being 99 bushels. The ground on which it was raised was bottom land, and corn stubble plowed immediately before planting; planted on the fifth day of May, in hills three and a half feet apart, with from three to four stalks in a hill; cultivated with harrow twice, cultivator once, and plow twice.

The principal crops of the county are wheat, corn, oats, rye and barley. Of wheat, by assessors' returns, there were raised in the county the past year about 400,000 bushels; corn, 566,974 bushels; oats 450,820 bushels; rye 50,722 bushels; barley 10,907 bushels. The potato crop was lighter than usual and prices for them ruled high—from 60 to 90 cents per bushel. There has been a good deal of sorghum raised and manufactured in the county, but the scarcity of mills for manufacturing has had a tendency to keep many from raising it who would otherwise have done so. We can undoubtedly raise molasses here cheaper than we can buy it.

Sheep have been the great item of attraction at our fair and in the county, and there has been many thousands taken to Western States from the county this year. By the introduction of thoroughbred Spanish sheep among our flocks, we notice a decided improvement in the character of them, a portion of which we may justly attribute to the influence of the Agricultural Society. The show of fruit was very superior, especially that of apples, of which there were some specimens we think unsurpassed in the State.

COSHOCTON COUNTY.

The thirteenth annual fair of the Coshocton county Agricultural Society was held at the fair grounds in this county, on the 14th, 15th and 16th days of October, 1863. It was well enough attended, and the show of stock was nearly as good as usual; and pecuniarily it sustained itself, the receipts exceeding the expenditures about one hundred dollars. But as the object of the Society—the promotion of the agricultural interests of the county—was disregarded by the people, it may be said that *as an agricultural fair* it was very nearly a failure.

No improvements worthy of notice in agriculture; none in agricultural implements, nor in household manufactures during the last year. No competition for field crops.

The principal crops raised in this county are corn, wheat, hay and wool. Owing to the drouth the crops of corn, wheat and hay were very much below the average. Our wool crop for the year 1863 is estimated at four hundred thousand pounds, sold on an average at seventy cents per pound.

The Society is out of debt, and has some thirteen hundred and forty-five dollars surplus funds on hand; so the finances of the Society may be said to be in good condition. The number of members during the year 1863 was two hundred and seventy-nine.

DELAWARE COUNTY.

Although our population has been greatly diminished by our men having volunteered in the military service of the government in putting down the rebellion, yet the interest taken by our

county in agriculture has not abated. The annual county fair was held this year on the 30th of September, and the 1st and 2d of October.

We rather increased our premium list, and the amount awarded for premiums was about $800, which has been promptly paid. Our Society numbers 740 members this year. Our cash receipts from all sources amount to $1,148. The indebtedness of the Society last year and the expenses of this year exceeds this sum a little.

The fair grounds of our Society are ample (17½ acres), beautifully located and well improved; are paid for, and worth about $5,000. The usefulness of the Society has shown itself in an improvement in every department of agriculture The past season has been one of the severest ever known in this county. The cold, wet weather last spring prevented early planting, and the drouth which ensued continued throughout the season. The early frost in the fall greatly injured the corn, which was late in ripening. Notwithstanding these things we had an excellent show of vegetables and fruit. There were also some fine specimens of corn and wheat on exhibition. The show of stock was good, especially that of sheep, which has never before been equalled in our county, either in respect to quantity or quality.

The principal crops raised in this county are those usually raised in this part of the State.

Great attention is paid to the culture of flax, both for straw and seed. We have two large mills here for the manufacture of the straw, and one for the manufacture of oil from flax seed.

The raising of stock is a very prominent branch of agriculture in this county. We have no data from which to estimate the gross quantity of any crop raised in this county, nor of the average yield per acre. Upon the whole our Society is in a prosperous condition.

FAIRFIELD COUNTY.

The Society of this county held its fair on Wednesday, Thursday and Friday, the 7th, 8th and 9th days of October, 1863, and notwithstanding the strongest efforts were made to influence the people not to attend the fair, or bring their stock or articles there for exhibition, by a few men of ultra political prejudices and opinions, it was nevertheless a complete success.

The halls were all well filled. The ladies of our town and county deserve great credit for their energy and skill in getting up fine butter, cheese, preserves, jellies, jams, pickles, sealed fruit of all kinds, quilts, coverlets, carpets, rugs, &c., and different varieties of embroidery, all of which went to fill up the halls and add to their beauty.

The principal crops raised in our county are wheat, rye, corn, barley, potatoes, tobacco, and a considerable quantity of sorghum.

The premiums awarded and paid amounted to $680.40, and there remains in the Treasury $131.98.

FRANKLIN COUNTY.

At our annual meeting an amendment to the Constitution was adopted, reducing the number of the Board of Managers from 20 to 9. The following officers were then elected: President, Jared Forsman; Vice President, Jas. M. Clark; Treasurer, John M. Pugh; Secretary, C. S. Glenn. The following managers were selected: G. W. Williams, Moses Seymour, Jacob Powell, A. R. Innis, W. T. Taylor, D. L. Holton, W. D. Mason, T. W. Tallmadge and G. Scott.

During the year and prior to the holding of our Annual Fair, the grounds were considerably improved by the planting of a number of ornamental trees. During the past winter the grounds were leased to U. S. Quartermaster Burr for the purpose of being occupied by an artillery company, then in process of organization, with certain restrictions, which he refused to comply with, but afterwards took possession of the grounds and sent the artillery company there.

The men destroyed a number of the buildings, burnt up benches, tables and a portion of the fence, and cut up the ground terribly, by hauling their heavy battery wagons over it. They occupied the grounds about six weeks, but Quartermaster Burr has steadily refused up to this time to allow damages that were done by the company. The Board were, therefore, compelled to make a large outlay in fixing the grounds and buildings up in good order for the Annual Fair.

The Fair was held on the 8th, 9th, 10th and 11th days of September, and although the condition of the country was such that many of our citizens were absent from their homes, and the season had been very poor for the production of crops, etc., yet we had a very good exhibition, which was largely attended, the receipts being larger than for several years past. All the expenses incurred, and all the premiums awarded, that were called for, were promptly paid, and the Society will be enabled by the balance remaining in the treasury to reduce the debt incurred in 1862 to about $500.

The number of our members remain at about the same figures as per last report, say 1,200. We have had but few meetings during the year, at which nothing of general interest transpired. Our grounds and the buildings thereon are in a good state of preservation, and may be safely estimated to be worth fully $10,000.

The principal crops raised in our county are wheat, corn, rye, oats and barley. Considerable attention is also directed to the raising of stock. More capital is, perhaps, invested in stock raising in our county now than at any former period. Little attention is paid to the cultivation of Sorghum, but we believe that those who have cultivated it have been highly successful.

Owing to the drouth in the fall the crop of wheat was quite small; considerable was winter killed. The average yield was about twelve bushels. Corn, in consequence of the very dry weather, failed to such an extent that it averaged only some 25 bushels; barley about 30; oats about 22, and rye about 15. No destructive insects were visible. The weather was very dry during both summer and fall.

GALLIA COUNTY.

Being on the border of the rebellious states, and having a large government post at our place, and the excitement of the "Morgan raid" last fall, we did not get to hold any Fair in our county. We have held an election for officers and prepared a premium list for the last two years, but have been prevented from holding any Fair. Government has our grounds and buildings for a wagon yard and forage house, and will give us no control; so if we should have attempted to hold a Fair, we would have had to prepare other grounds.

GEAUGA COUNTY.

The Annual Fair of this Society for 1863, was holden on the 9th, 10th and 11th days of September last. Though not as successful as some Fairs previous to the breaking out of the rebellion, yet there was much improvement upon those of two or three years past. The indebtedness under which the Society has been laboring for a number of years, is being gradually reduced, and when this burden shall be entirely removed we will, with reason, anticipate for our favorite Society a prosperous and useful future.

There were in all 540 entries, of these 146 were of horses, 80 of cattle, 40 of sheep, and all other articles 274.

The great staple products of this county are butter and cheese, and the amount produced is annually increasing, as well as the quality improving. On account of the dry weather of the

past season, the quantity was not so much increased over that of previous seasons, as would otherwise have been the case; and had it not been for the largely advanced price received for these products, it would have been a "hard season" for the dairymen, as from the short hay crop they were necessitated to dispose of many of their cows in the fall, at ruinously low prices. As it was, however, the year 1863 may be looked back to by the manufacturers of butter and cheese as one in which they received a better return for their labor than in any previous one.

Next to dairy products in importance to us is the growing of wool, and in this department there is increasing interest and improvement. In the county may be found some very fine flocks of the fine wooled varieties of sheep, as well as of the class of wool sought after since the breaking out of the war.

The following, clipped from the assessors returns for 1862, will give some little idea of the importance of the dairy interest to this county:

In 1862 were manufactured 4,285,972 pounds of cheese, selling at an average of 7 cents per pound, amounting to	$300,018 04
Butter, 700,043, at 15 cents, amounting to	105,006 45
Making for the two products	$405,024 49
The same amount made and sold in 1863, at say 50 per cent., add	202,512 24
	$607,537 73

Adding to this the amount consumed in the families of manufacturers, and considering errors in making returns, it is safe to say that the value of dairy manufacture in the county of Geauga for the year, would amount in the aggregate to $1,000,000.

GREENE COUNTY.

The Greene County Agricultural Fair was held upon the grounds of the Society, September 8th, 9th and 10th, 1863. There were interests of a local character which tended very much to lessen the attendance, and consequently the receipts of the Fair. The general interests of agriculture have not, however, in any degree diminished. Grain crops are fine. Wheat, though not probably up to some former crops in quantity, is of superior quality. Corn was injured by frost to some extent, yet the large area cultivated, and the unusually high prices realized, make the crop decidedly profitable. Quite an interest (in common with other portions of the State) is taken in wool growing, and as a result, our pastures, which of late years have been almost depopulated of sheep, are again being filled, and it is hoped the natural adaptation of our county to the rearing of sheep will incline our farmers to devote more attention to this department of agriculture than it has heretofore received at their hands. Tobacco has become an important item, and many acres of our best land, which have heretofore been devoted to the cultivation of Indian corn, are now devoted to the culture of tobacco. Whether the diminution in the quality of lands thus appropriated may not in time show a balance to the disadvantage of tobacco culture, remains to be seen. Our other crops, such as barley, oats, potatoes, &c., much as in former years. Horses, cattle, mules and hogs are all receiving their due share of attention, and exhibit a manifest improvement; in these classes of stock our county occupies a position second to none in the State. It is hoped the degree of apathy manifested in the Agricultural Society of our county during the past year may not again occur, but that the increased facilities for the promotion and successful pursuit of agriculture will awaken an interest worthy of our position as a county in the great State of Ohio.

HANCOCK COUNTY.

The Twelfth Annual Fair of this Society was held at their grounds in Findlay, on the 30th day of September and the 1st and 2d days of October, and in consequence of a combination of circumstances over which the Board had no control, was poorly attended—indeed, was what might be termed a failure, compared with previous exhibitions. The season had been very unfavorable to producers, on account of long-continued drought. The unsettled state of the country, and exceedingly unfavorable weather during the Fair, also operated against the exhibition. The Board, however, had done all in their power to make the annual reunion of the farmers one of pleasure and profit. Extensive and permanent improvements had been made on the grounds, and a very respectable premium list had been announced. There were 529 entries made in the different classes, and $359 75 awarded as premiums. We have about 260 members.

HARDIN COUNTY.

The Fair for this county for 1863, commenced at Kenton, on the 30th day of September, and bid fair to be an excellent exhibition on the second and last days, there being more than the usual number of entries up to the night of the first day; but when the morning of the second dawned upon us, it was portentous of a deficit, as it was then raining, and promised to continue for several days. The officers therefore thought it advisable to close, and did close, having received enough to pay expenses. The Society is out of debt, and has about $75 in the treasury, and may be considered still in existence, but never can accomplish much until the grounds are considerably enlarged. The outgoing officers agitated the subject as much as was advisable, and found the minds of the tax-payers not prepared for any additional burdens so long as they are so heavily taxed to crush this wicked rebellion in the seceded States. We think agriculture and the mechanic arts are receiving the same attention, and perhaps making as much advancement, as at any period since the organization of the county, notwithstanding the absence of many of our brave boys in the army. Our crops of all kinds are unusually light, but not owing to imperfect tillage, or any artificial cause, it being universally the case all over the State. For some time fears were entertained by the most thoughtful, that there was not feed enough in the county for our stock to winter upon; but kind Providence is dispelling these fears by so far blessing us with an unusually easy winter, and we now entertain the hope of getting all through in as good condition as in years past. The new wheat crop is very promising, and we would here say that wheat and grass must ere long become the chief staples of the county. Geological examinations and chemical experiments demonstrate that our county is susceptible of producing as much per acre as any in the State, but before this is fully realized we must have a better class of farmers, though many are up with the age, having learned, not so much from agricultural books and papers (things unfortunately too much neglected by most farmers), as from experience, and paying attention to the best class of farmers in their respective neighborhoods. This county will never be equal to the Miami valley or the Scioto bottoms—say from Columbus down—for producing large crops of corn; but it may be put down as an average one. Perhaps there is no county in the State that surpasses this for variety and superiority of fruit. Cattle, horses, hogs and sheep have received their full share of attention, except the latter, the improvement of which is unluckily too much neglected. The county is being rapidly settled and improved, owing to the comparatively low price of land. If we had plenty of building stone, and more durable water for milling and manufacturing purposes, together with a little better roads, we would soon rank among the first counties in the State.

HARRISON COUNTY.

The Sixteenth Annual Fair of the Harrison County Agricultural Society was held at Cadiz, on the 30th day of September and the 1st and 2d days of October, A. D. 1863. It was very well attended from this and adjoining counties. The attendance more than met the expectations of our citizens, for some time before the Fair came on, it was urged by some that we should postpone the Fair for the present season, fearing that in consequence of the war, and the great number of political meetings the people had passed through, the Fair would not sustain itself. But the Directors decided to hold a Fair, notwithstanding all that could be said against it. The time for holding the Fair came on, and with it came the people in great numbers. We are now more than ever convinced that our Fair is no longer an experiment, but is one of the established institutions of the day. Our people seem to have a desire to meet together once a year, in order to become more thoroughly acquainted with each other, and to interchange views upon the subject of agriculture. The number of entries of stock and other things was about equal to any former year. Our show of horses was excellent—fully equal, we think, to any former year. Mules, cattle and hogs were of a good quality, and about equal to other years. There was a greater number and a better quality of sheep on exhibition this time than ever before; they were brought from other counties and other States; there were sheep sold at this Fair as high as one thousand dollars per head. The Ladies' Department was very well represented; the ladies of our county deserve great credit for the interest they took in assisting to get up an attractive Fair. Floral Hall was made very attractive; it was filled up with articles from the finest embroidery to the heaviest domestic linen, carpets, &c. Taking everything into consideration, we think that our prospects are bright for the future. There were no statements made by competitors for premiums on crops. Our principal crops are wheat, corn, oats, hay and potatoes. We have no means in our power of determining the amount of grain raised in our county the past year. Wheat was about an average crop; corn, oats, hay, potatoes, &c., were very light, in consequence of the dry weather.

HURON COUNTY.

The Ninth Annual Fair of the Huron County Agricultural Society was held at Norwalk on the 22d, 23d, 24th and 25th of September, 1863. The weather was favorable and a large number of people were in attendance. The Fair was a success in all respects. The exhibition of horses and sheep was the largest and finest display ever had in this county. The other departments were all well represented. There were but few grain samples and field crops entered for competition. The reason assigned for the deficiency in this department was that the drought of June and July injured all kinds of spring crops so ruinously, that no one considered that he had raised a premium crop of corn, oats or potatoes.

The whole number of entries were 1,250; the number of members for the year, 275; the receipts of the Fair were $1,435; the amount of awards, $696.

During the past season the Board of Managers has leased 17 acres of land for a new Fair ground, for the term of ten years. The new Fair ground has been fitted up on the most improved plan, at an expense of over $3,500. The new Fair ground is located near the central part of the pleasant village of Norwalk. The new Floral Hall is one of the finest in the State. The other buildings and fixtures, and half mile track are fitted up on the most improved style. The Floral Hall, at our last Fair, was the centre of attraction. To the ladies, the Society is chiefly indebted for the taste and skill displayed in ornamenting the Hall, which contributed not a little to the success of the Fair. So long as the ladies are interested in our Fairs, there can never be a failure.

We are rejoiced to report after two years and a half of civil war and rebellion, that our Society not only still lives, but is more prosperous than when the war begun.

The citizens of Huron County are truly proud of their Fair grounds. Our County Fair is at length looked upon as a fixed institution, and it is growing in favor with the people from year to year.

The wheat crop of the last season was good. The number of bushels raised in the county has not been ascertained. The wheat was of more than an average quality; it is very heavy, and was gathered in fine condition. The corn crop is light and of a poor quality. The drouth in the early part of the season retarded its growth, and the frost in September struck it before it was matured; the crop is not more than two-thirds what it promised in September. Oats were very light; the crop was also injured by the drouth. Late oats were injured by a red insect, called by farmers "red lice." The potato crop was good; more than an average. But little attention is given to the cultivation of roots for feeding purposes. There was a good crop of flax grown the past season, for which farmers realized a good profit.

But little sorghum is cultivated in this county; the molasses is not very merchantable. There is less interest taken than there was two years ago in the cultivation of sorghum.

There has been a large increase in the introduction and use of all kinds of improved agricultural implements the past year. Farmers have been compelled to see the necessity of labor-saving machinery, to take the place of our brave men who have left the peaceful pursuits of agriculture for the sake of their country and our institutions.

The seventeen year locusts visited the western part of our county the past summer. They left their marks on the oak trees; they did little damage to anything else.

The cultivation of grapes is creating no little excitement in our county at the present time; a large number of vines will be planted in the spring. The agricultural interest is progressing in Huron county.

JACKSON COUNTY.

The Annual Fair for 1863 was held at Jackson C. H. on Thursday and Friday, the 1st and 2d days of October, in the Society's Fair grounds. The interest taken in the present Fair fell far short of former times. The people were so much taken up with the political topics of the campaign, that the interests of the Fair was much neglected, and politics had something to do in its organization, last January; but we are all calm now and expect to do better hereafter.

Wheat and corn are the staple crops of the county. Wheat, in the early part of the spring, looked rather poor for an average yield, but as harvest approached it come out finely, so that the yield is an average one, say ten bushels to the acre; no injury from insects; some fields badly damaged with smut. The corn crop was a very short one; the very dry summer cut it short, full one-half, injured in some locations by the wireworm; the yield will not exceed 18 bushels per acre. Oats almost a failure; cause dry summer and rust. Hay, the extreme drouth curtailed the yield fully one-half, rather poor in quality.

Fruit—a fair crop, good in quality. Peaches inferior in quality and a short yield. A good crop of the small fruits and berries. The past summer was remarkable for the continuous drouth, which was the chief cause of the short crops.

Jackson county, being situated in central Southern Ohio, is not a grain producing and stock growing district. Although we have some nice horses and excellent herds of graded cattle, and sheep husbandry is largely on the increase, yet the manufacturing of pig iron is the leading branch of industry. There is within the limits of the county ten furnaces, producing on an average two thousand tons per annum to the furnace, making an aggregate production for the ten, of twenty thousand tons per year; giving employment to one thousand five hundred per

sons at $1.20 per day, consuming 120,000 bushels of corn, 6,000 barrels of flour, 400,000 pounds of pork, and 16,000 pounds beef, &c. The prices paid at the furnaces for the iron per ton, will average for the year ending December, 1863, $33, making a total for the year, of $660,000. We think this is quite an item for the "huckle berry knobs" of little Jackson.

The membership of the Society is 89. No premiums were awarded for field crops.

LAKE COUNTY.

The Thirteenth Annual Fair of the Lake County Agricultural Society was held at their grounds, on the 30th September and 1st and 2d of October. The weather was good, and the attendance larger than ever before; 470 members, and $533 taken for single tickets. The whole number of entries was 1,033—over 300 more than last year. Each department of domestic industry was well represented. The number of entries in domestic manufactures of cotton, woolen and linen, was 135. The show of fruit and vegetables was very attractive. The show of cattle, horses and swine was remarkably good. In sheep there was probably a better exhibition than ever seen at any county Fair. The display of butter and cheese was, as usual, very creditable to Lake county. The Society is now entirely out of debt, and has good pleasant grounds and buildings.

LICKING COUNTY.

The Sixteenth Annual Fair of the Licking County Agricultural Society was held at the Fair grounds, near Newark, Ohio, on the 30th day of September and the 1st and 2d days of October, 1863. The Society this year offered about seventeen hundred dollars in premiums, and of this sum a larger proportion than usual was awarded to exhibiters. The interest felt by the people of this county in the annual county Fair, has not abated. The exhibition of horses and sheep evinced great and steady improvement. The show in those departments was excellent; in cattle, good; and in most other departments, fully an average. The Society numbers over three hundred members.

LOGAN COUNTY.

The Thirteenth Annual Fair of the Logan County Agricultural Society was held at the Society's grounds at Bellefontaine, Ohio, on the 6th, 7th, 8th and 9th days of October, 1863. The prospect for a good Fair and a large amount of entries was good until about the commencement of the Fair, when a storm set in; it became very cold, so that it was necessary to have fire in various parts of the grounds. Notwithstanding the continued rain and severe cold, quite a number of entries were made in each department—more than 60 of horses, and others in about the same proportion. There was quite a competition in agricultural implements, especially plows. Floral Hall was well filled. The exhibition of fruit was excellent. The paintings were magnificent—more than 40 from one lady (Mrs. Strong, of Northwood). There was some fine trotting done; A. C. Jennings' stallion "Mora," from Urbana, Ohio, made the best time. J. E. Smith exhibited the best thoroughbred bull; J. M. Glover some of the best thorougbbreds of other kinds. The principal crops raised in Logan county, are wheat, corn, flax-seed, oats, barley, and potatoes. Wheat was less than an average crop. The greatest yield, 36 54-60 bushels per acre, was grown by Dr. B. B. Leonard, of Liberty township. The best sample of wheat was raised by John Pollock; the best corn by Washington Allen; the best oats by D. W.

McCracken; the best flax seed by John Bergen; the best potatoes by Samuel Jeffers. The best hogs were exhibited by David Michur, of Jefferson township, and M. V. Rowand, of Harrison township. In consequence of the continued wet weather, the exhibition of sheep was nearly a failure.

LORAIN COUNTY.

The Seventeenth Annual Fair of the Lorain County Agricultural Society was held at Elyria, on the 7th, 8th and 9th days of October, 1863. The Board of Managers of said Society had thoroughly refitted the grounds, and made every necessary preparation for a successful Fair. They had offered liberal premiums, and spared no expense in all the preliminary arrangements. But the weather, over which the officers of the Society had no control, was against us; and if any week from September 1st to November 20th, '63, had been selected for the Fair, no *one* week could have exceeded in the severity of the weather, both in regard to cold and rain, the one hit upon for our annual Fair. The second and third days of our Fair the wind blew cold, and the rain came down, if not to make a flood, at least in sufficient quantity and at such a time as to almost annihilate our Fair. Still, by the help of a great camp-fire kept burning night and day in the middle part of the Fair grounds, and by the energy and determination of the officers and exhibiters, the Fair went on. The entries were made, the awarding committees made their examinations and awards, and the following are briefly the summing up: whole number of entries, 951; whole number of members, 362. Notwithstanding our many set-backs, our Society is able to pay all of its indebtedness. This shows the foresight and wisdom of the law, which allows counties to aid regularly law-complying county and district agricultural societies, to help carry them through just such difficulties as we met with in our annual experience of October, 1863. We say, after our experiences at our annual Fairs of 1861 and 1863, let no one attempt to repeal that law; for the weather, upon which the success of a Fair greatly depends, is beyond the control of the officers of the best regulated societies. The general condition of agriculture in Lorain county is improving and encouraging. The progress of agriculture in our county, notwithstanding the desolating war which is constantly draining all surplus help from our farms, is still so marked as to be a source of much gratification. The season of 1863 was marked by no peculiar characteristics. In regard to productiveness, it may be classed as about an average season. The weather was rather cool and very dry, always excepting the second week in October. But take the season all in all, the Lorain agriculturists have abundant reason to be thankful that it is with them as well as it is. We have had health, and the earth has brought forth in sufficient abundance to amply reward the husbandman. We can truly say that our lot has been cast in pleasant places. Ours is a goodly heritage!

LUCAS COUNTY.

In compliance with the circular received by this Society, we proceed to forward our annual report. The statements of competitors for premiums were verbal, and not recorded by the awarding committees. The principal day of the Fair being the same as that appointed for district military drill, greatly confused the exercises of the exhibition. This Society, ever since its organization, has seemed to be surrounded with difficulties, which at its inception arose principally from the unimproved state of the county, and periodically either from the financial embarrassments of the country, or the abundance of patriotism in the people, the latter of which, for the last three years, having absorbed nearly every other question. The Society numbers about three hundred of the best citizens of the county, and at this present writing a better spirit and more determination is manifest than at any former period in the history of this Society.

The prospects of the Society are good, as the county is being developed in agricultural and mechanical interests. Progression is the order of the day, and as an evidence we have adopted a plan for the purchase of suitable grounds, which is no small undertaking for this society, but which will be more fully explained by our representative, Pres. W. C. Earl.

The usefulness of the organization is becoming more apparent every year, in the rapid improvement of premises, stock and crops of all kinds, which is very evident in this county.

The principal crops of this county embrace wheat, corn, oats, hay and potatoes. Peas, beans, buckwheat, barley, rye and tobacco have been planted occasionally. While tobacco is receiving more attention than formerly, it has not been an entire success this year in consequence of early frosts.

We cannot give the aggregate quantity of these raised in the county, but from the best sources of information we estimate the wheat crop, compared with 1862, as two-thirds; the corn crop as one-third, the average of wheat being about 12 bushels per acre, and of corn 40 bushels of ears. Much injury resulted to wheat from the attacks of the Russian fly and weevil, while corn was seriously damaged by the early frosts, and in some low lands entirely killed, or where late planted. The drouth very much diminished the crops of hay and oats; the former bringing double its usual price in our markets.

The potato crop is quite an institution in this county. There has been no deficiency in the supply at any time, and every year the quantity exported to other portions of the States is largely on the increase. Several excellent varieties have been secured which have the desired qualities of productiveness, long-keeping and fine flavor, and commonly yielding two or three hundred bushels to the acre.

We can say but little respecting the live stock of the county, further than that horses are being much improved. The breeders and raisers of cattle are bestowing much more pains to secure the best, while sheep are receiving more than usual attention. But swine do not have that care and regard which are essential to proper growth and development, yet in every branch of industry the progress is very marked.

MADISON COUNTY.

Our society has this year a surplus of about one hundred dollars, which is an unprecedented fact in its history. This was the case the last year to a less extent, and is attributed by us to the abandonment of the "family ticket" system, so general with county societies, and the substitution of one requiring a ticket to be taken upon each admission, as I explained last year in my report to you. In consequence of this change, we do not register all persons purchasing packages of tickets as members of the society, but only such as are *bona fide* members and exhibiters, and so our list of memberships is much smaller than usual. We number 88 annual members, 14 five year members, and 2 life members.

With this balance in the treasury and the good feeling which exists among our people, we hope by proper management to extend the usefulness of the society still more and more.

Our principal crop is corn, the probable amount of which is one million of bushels, with an average yield of thirty bushels per acre. Wheat is the next crop in importance, one hundred and fifty thousand bushels being raised, and fifteen bushels per acre an average.

Eighteen thousand tons of hay were cut from about sixteen thousand acres. The crop of hay was lighter than usual by one fourth, because of the dry weather in June, while the frost in August injured the corn to a considerable extent.

Considerable attention has been paid the past season to tobacco culture, and it will prove a highly remunerative crop. It was in some cases injured by frost, but not materially I think.

MAHONING COUNTY.

The society held its seventh annual fair on the 6th, 7th and 8th days of October, 1863. The first day is devoted to the entering and registering of all articles and stock entered for exhibition. The exhibition proper takes place on the second and third days of the fair. This year the two days which were devoted to the exhibition were very rainy and disagreeable, but, notwithstanding, a goodly number of people were present on these two days. The fair this year would undoubtedly have been one of the largest, best and most interesting ever held in this county had the weather been favorable.

The number of entries this year was not large, owing to the disadvantages above mentioned; they numbered about 800.

Our show of cattle was fair, and the same may be said of horses and sheep, all of which would have been larger and more creditable to "Little Mahoning" had the elements favored us. Floral Hall was an ornament and success, for which our people should feel proud.

Our farmers have devoted considerable time and expense to the raising of cattle and sheep, and are now beginning to reap their harvest of rewards. Horses are raised to some extent. Enough grian is raised usually for home consumption, and some to send abroad.

MARION COUNTY.

The twelfth annual exhibition of the Marion County Agricultural Society was advertised, to be held on the 22d, 23d, and 24th days of September, but owing to the election excitement, was postponed to the 21st, 22d, and 23d, days of October, 1863. The Fair was fully up to our expectations, considering the condition of stock, and shortness of crops.

Total number of entries, 285. There was no competition for premiums on field crops. The number of members for 1863 was 61.

Marion county may be considered a grazing and grain growing county; the southern and southeastern to grain growing, the northern and western to grazing. The principal crops raised are: corn, hay, wheat, oats, buckwheat and rye; all crops below an average this year.

MEDINA COUNTY.

The society is in a prosperous condition, more so than ever before, and is doing a good thing in the way of stimulating our farmers to greater exertions in farming of all kinds, especially in the products of the dairy, and in the raising of horses, cattle, and sheep. We have stock of the various kinds mentioned that are hard to beat in any adjoining county.

The principal crops raised are hay, corn, oats, potatoes, and wheat. In good seasons we can raise good crops of either kind mentioned, but we have not got a good wheat soil. I cannot tell the amount of each raised, as many of our farmers won't tell for fear of being taxed on their crops. Average yield per acre, hay, 1½ tons; corn, 40 bushels; oats, 30 bushels; potatoes, 100 bushels; and wheat, about 12 bushels per acre. The striking characteristics of the previous season were drought and frost, and between the two they *struck* pretty hard. The insects that injure crops are the worm in apples, grasshoppers and weevil. We had large quantities of locusts* through this section; trees were stung by them very badly, but I rather think it is a help instead of a hurt, as many of our farmers neglect pruning and cutting back their fruit trees, and these the locusts were very severe on; wherever they stung a limb it withered and fell off in a few days. I think it will be the means of their raising larger and better crops of fruit in a year or two. Many of our cultivators of grapes in this section tell me they have this

* Cicadæ Septemdecem.

year for the first time discovered a worm on their vines, that eats leaves and tender runners, and they think it a great injury. Some one posted in grape culture can answer satisfactorily I presume. We have a heavy clay soil in this county, and I have taken a great interest in under-draining, and am satisfied that if our farmers would underdrain more the frosts would not affect their crops as they do at present; consequently crops would nearly double, and the peach crop, which is nearly a total failure here, would be as good as in any other section of the State. We have one manufactory of drain tile in this county, and it needs some one to convince the people of the good effects of draining in order to get them to try it; every one thinks it is too costly, when in fact it is the best outlay they can make.

MIAMI COUNTY.

The seventeenth annual Fair of the Miami County Agricultural Society was held at Troy, September 30th, and October 1st and 2d, 1863.

The attendance at the Fair was much better than last year. The exhibition of horses, cattle, sheep, and swine, was equal to any former one.

The show of grain, except wheat, was not as good as usual, and vegetables were not to be compared with other years. The Mechanical department was well represented. The show of fruit was good.

The whole number of entries was 704. There were no entries for farm or field crops.

The wheat crop of this year was fully equal to any other harvested in the county; it was not injured in the least by insects, rust, or smut. Corn is not more than half a crop; the drought of June and July prevented it from maturing before the early frosts of September, put a stop to all further growth. Much of the corn grown on the clay lands will be of little use except to feed stock cattle. Sorghum and potatoes each half a crop. Tobacco—this is a new crop for our county; preparation was made last spring to put out a large crop compared with last year, but the dry weather in the planting season prevented many from planting as much as they intended. The average product this year per acre is about 800 pounds, while the average of a good year is 1500 pounds. The kinds planted by our farmers are Connecticut, Ohio, and Cuba seed leaf. Of these, it is thought by our best cultivators, the Connecticut is the most profitable. The Maryland Broadleaf, as far as it has been tried, gives promise of being a valuable kind. At present prices, tobacco is the most remunerative of the various productions of the county. The fruit crop was full an average one; apples, nor in fact any other kind of fruit, is raised in our county for export, and unless the climate should undergo a great change it never will become celebrated for its fruit.

MONROE COUNTY.

The twelfth annual Fair of the Monroe County Agricultural Society was held in Woodsfield on the ———————— days of October, 1863.

The first two days of the Fair being rainy and cold, prevented a large attendance or a great number of entries; but the last day being fair the attendance was very encouraging. Yet, in all respects, our Fair was superior to that of last year; and compared favorably with those held in time of peace, and under the most favorable auspices; so that we are encouraged to make further efforts to preserve our organization, liquidate our debt, and to enlarge the usefulness of the society.

The display of sheep was the best heretofore made at our Fair, being principally of the Spanish and French Merino varieties, illustrating a fact patent to travelers through our county that our farmers are giving much attention to growing of wool, and that of the better qualities.

The great staple products of this county are tobacco, wheat, corn, oats, potatoes, hay, and sorghum. The grape is also extensively cultivated, especially in Switzerland township, where most every farmer has a vineyard. The vine having produced abundantly this year, a large amount of wine has been made.

A large amount of flax was raised in this county this year for home consumption, in view of the present high price of cotton.

MORGAN COUNTY.

The Society held its Fair on their grounds near McConnelsville, on the 29th and 30th of September and 1st day of October, 1863. The weather was pleasant, and, under all the disadvantages incident to an extremely dry season, and agitation of the public mind, the anticipation of the Board of Managers was fully realized. The receipts were sufficient to pay the premiums awarded and the expense of holding the Fair.

Samuel Harris was awarded the first premium on wheat crop, and the following is his statement detailing mode of tillage, &c.:

Samuel Harris, being duly sworn, says that he raised a crop of wheat the past season upon 7¼ acres of land, measured by himself and Milton Y. Garvin, and that the quantity of wheat raised thereon was 273 bushels and 21 pounds, weighed, and that the following statement in regard to the cultivation of the same is correct to the best of his knowledge: The ground, a low creek bottom, was sown in oats in 1862; the rust and weevil ruined the crop; I then burned the straw on the ground, and hauled, as nearly as I can recollect, about 30 loads of manure on the field, and spread it on the poorest places, where it was the most needed; plowed the ground about the first of October; sowed the wheat and harrowed it in, and immediately rolled the ground with a common wooden roller; the land lies so low that it overflows usually from four to six times in a season; but a part of the ground only was overflown whilst the wheat was growing, but where it did overflow, the crop was much the best; the wheat is what is called the "weevil proof." SAMUEL HARRIS.

Sworn to and subscribed before me, this 17th day of November, 1863.

H. DUNSMON, J. P.

The prospect for progress and usefulness of the Society is good. Since the organization there has been a very decided improvement in the county of stock, fruit and vegetables, as exhibited at the Fairs; also, the display of manufactures and farm implements has very much improved.

The principal crops raised in this county are wheat, corn, oats and tobacco; some rye, barley, buckwheat, sorghum, flax, and potatoes, and considerable fruit. In consequence of extreme drought, there was less raised per acre this year than in 1862.

The number of members for 1863 is 236.

MUSKINGUM COUNTY.

The condition of the agricultural interests of this county shows an advance upon the previous year. Improved methods of tilling the soil, more carefulness in the selection of seeds, and in their adaptation to the soil, increased use of labor saving and economical agricultural imple-

ments in the planting and harvesting of the crops, greater attention to the perfection of the breeds of domestic animals, and more interest manifested in the success of those engaged in agricultural pursuits, all make manifest the truth of the saying that "the world does move."

The unsettled state of our public affairs has not, perhaps, affected us as much as was feared. True, many more persons might and would have been employed had they been here, yet the scarcity of laborers has caused many a one to appreciate as he never did before, the use of agricultural implements in the planting as well as in the gathering of the crops.

The long and severe drought of the past season most materially lessened the crops of hay, corn, potatoes, and fruits, while the early frost brought an additional share of disaster to the corn crop. The potatoe bug laid the fields planted with that esculent under severe contribution, and in some instances planters did not realize much more than the seed planted. The average crop of corn will not probably be more than 25 bushels to the acre; potatoes have not yielded an average half a crop; hay not over half a ton to the acre.

The crops of wheat and oats have generally been good, both in quantity and quality. This is more especially true of the former. The ravages of the midge have not been very serious. More care seems to have been taken in putting in the wheat crop than formerly. The land has been better prepared and manured, greater care exercised in sowing and in the selection of seed, and as a matter of course greater results were realized than would have been under the "slip-shod" system of farming. In addition, farmers are becoming more alive to the fact that twenty acres well farmed is of more value to them than double the quantity half farmed or not farmed at all. Many are beginning to see that it is not alone the *quantity* of land under cultivation which produces the best results unless the *quality* and *quantity* of the labor and manure expended are fully commensurate to the area cultivated. The average crop of wheat is about 15 bushels to the acre, that of oats about 20 bushels.

The condition of the stock interest is flattering. Much care and expense have been employed in improving sheep especially, although horses, cattle, and swine have not been neglected. The demand for wool has had an excellent effect in turning the attention of our "sheep men" to the permanent improvement of their flocks; and it is not too much to say that our Fair held in September presented as many fine specimens, and of as good a quality as have ever been exhibited on any similar occasion.

Our "cattle men" have not been derelict in endeavoring to improve the character of their herds, although they have not kept up with those who are engaged in the sheep and wool departments.

But what shall be said of the "horse men"? At the Fair we had an abundance of very fine specimens of the equine race, from the pure thoroughbred to the classes that do not claim such an exhalted position. Indeed the "horse interest" was to many, the paramount interest of the occasion, and much discussion was had as to whether that interest was not absorbing every other, and whether the Fair itself had not degenerated from the original design of its institution.

Much, very much, is to be said in favor of the horse. He is a noble animal, and everybody loves him. Everybody is pleased to see him "go," and especially if that going is "fast," and is anxious to be present when his trial is made. Besides this, such is the public taste for such exhibitions that it would be next to impossible to get up a Fair which would pay expenses and be of any great use to the public in the exhibition of farm products and specimens of mechanical skill, without that feature in some form. But it may well be asked if the excitement attendant upon these trials of speed, and the apparent indifference of the public to look upon and appreciate the skill of our mechanics, and the result of the patient tiller of the soil, are not producing consequences which at no distant day will "use up" the Fair as an instrument for increasing and promoting the advancement of the mechanical and agricultural interests of community?

A report like this is no place for moralizing upon the effects of such exhibitions any farther

than the same injuriously affect the interest of the public in the exhibitions of the skill of our mechanics, and the produce of the labor of the agriculturists; yet the question is presented, is there no way in which the public can be sufficiently interested to give their attention to exhibitions manifestly for the purpose of increasing the wealth and happiness of the community, without the injurious effects following or attendant upon these trials of speed?

The sorghum crop did not suffer as much from the drought as was feared, but it is thought that the early frost materially injured it. Nevertheless thousands of gallons of syrup were made, and the feasibility of the permanent addition of the sorghum culture to that of other crops, demonstrated.

The interest in the culture of the grape has been to some extent increased. We have not had, it is true, "the grape fever," which has visited some other sections of our State, but that there is a growing interest in the culture of the grape is a gratifying fact. Many beautiful specimens were on exhibition at our Fair, which received the warmest commendations.

The fruit crop of the past year was much less than that of 1862, nevertheless we had a tolerable supply of apples, with some peaches, pears, and small fruit; very fine specimens of apples and peaches were at the Fair, and such an interest manifested as gave evidence that the hope is not ill founded that the future of the fruit culture will be a great advance upon the past.

Some very fine specimens of the handiwork of the ladies elicited warm commendations from the thousands who visited our Fair, and a magnificent collection of flowers gave an additional feature of elegance to the attractions of Floral Hall.

Upon the whole, we feel that the great interest which the Legislature designed to encourage in its laws upon the subject of agriculture, have not declined in the hands of this society, but that we have abundant reason to take courage and hope on and toil on until our hopes of seeing these great interests fully appreciated shall to a considerable extent be realized.

NOBLE COUNTY.

The Fair was held on the society's grounds at Sarahsville, Oct. 1st and 2d, 1863. This season was a success, considering the circumstances with which the entire country is surrounded The attendance was as large as could be expected. The stock exhibited in some instances was very fine, and I think that this remark may apply to our county generally. The improvement of stock in our county is very perceptible. The exhibition of poultry, farm implements, and domestic manufactures, about as usual. The fruit crop was a failure, generally speaking, though there was some good specimens. Potatoes, both Irish and sweet, and pumpkins, were considered a failure, though there were a few fine specimens.

The principal productions of this county are wheat, corn, oats, potatoes, tobacco, hay and sorgum, (the aggregate not known.) We had a fine wheat crop this year, over an average. Corn crop on low lands was good, and a large crop planted. Quite a short crop of hay, on account of the drouth; and large amounts of meadow land are being plowed for tobacco. The crop of tobacco is above an average. The sorghum crop was injured by the frost, and consequently falls below last year, though nearly enough to supply the county. Oats fair, but little sowed. Price of wheat, $1.00; corn, 65 cents; oats, 60 cents; potatoes, 75 cents; hay, $15.00 per ton.

OTTAWA COUNTY.

A County Fair was held at the fair grounds in Port Clinton October 7th, 8th, and 9th, 1863. There seems to be an increasing interest manifested in the success of the society, and for improvements in agriculture and the different breeds of animals.

The principal crops raised in this county are wheat, corn, oats, rye, hay, potatoes, sorghum, flax, &c. The wheat crop was good in quality, and about an average crop. Corn was, in the middle and eastern portions of the county, good; in western, cut by the August and September frosts, about an average yield in the whole county put together. The season has been very dry, and late sown crops have suffered in consequence. Oats were quite a light crop, in consequence of the drouth, and the crop was only about half. Rye not much raised, but good what there was. Hay light, and about half crop, but good quality. Potatoes about half crop, but good quality. Sorghum, an increased quantity and quality, and a large amount of syrup made, and of the best quality. Flax has been raised to considerable extent, and the yield was good, in quality and quantity.

The drain upon our labor for the army has affected our farmers to a considerable extent, but by the employment of machines they have made up to a certain extent the drain, and all feel in good spirit, hoping soon for the return of the blessing of peace.

PAULDING COUNTY.

The Paulding County Agricultural Society advertised their Fair to take place Thursday and Friday October 1st and 2d, 1863.

Thursday, October 1st, opened with forebodings of its success—rain commenced falling early in the morning and continued with scarcely an intermission until night. The 2d opened with a *chilly* prospect. By noon a number of entries were made by farmers from the townships of Crane and Carryall. Emerald township was represented by one farmer, leaving nine townships unrepresented, doubtless on account of the inclemency of the weather.

This Society was organized in 1859. In 1860 a Fair was held at the Junction in said county, which was partially a failure. Since that time there has been but little done on account of many of its former friends being engaged in the struggle for the existence of the National Government.

The inclemency of the weather during the two days of the last Fair prevented a full attendance. If we had fair weather at that time we would have had over 100 members.

The prospects of the Society are good. We are confident of 100 members at least for the year 1864. With a few changes in our Board, so that we will have a working Board, our success is beyond a doubt.

Wheat, very good. About the same number of bushels raised as in 1862. Average bushels to the acre, 15. Corn, not any more than half a crop. The frosts and drouth destroyed one-half of the crop. Oats, very little raised. Hay, half crop. Potatoes, about fourth a crop.

The scarcity of hands occasioned by the war is, or has been, a serious drawback in agriculture in this county. Although many of the farmers remaining redoubled their exertions during the last season, their efforts availed but little, by reason of the drouth and the frosts.

An influx of about 100 farmers this fall will *tell* in the future. The high prices for provisions, and the easy access to money, have stimulated this branch of industry.

PICKAWAY COUNTY.

There was no competition for crops at our Fair. The number of members is about 350.

The Society is in a flourishing condition at present. The number of entries for 1863 ex-

ceeded those of 1862 by about 200. It still, on account of the war, falls far behind preceding years. We trust that in the future it will be better. The surplus left, after paying premiums, was applied to the payment of an old debt of the Society of several years standing. There is still about $100 in the hands of the Treasurer.

The following are the principal crops raised in the county as near as I could ascertain by inquiry:

Wheat, 85,000 acres; 15 bushels per acre. Corn, 64,000 acres; 35 bushels per acre. Oats, 14,000 acres; 20 bushels per acre. Rye, 450 acres; 15 bushels per acre. Hay, 7,500 tons. Sorghum, 350 acres; 32,000 galls. syrup. Maple sugar, 29,000 lbs.; 4,600 galls. syrup. Broom Corn, 2,000 acres; yield per acre not known.

The season was dry, especially in May; Heavy frost in August, which injured corn in certain localities. Grasshoppers plenty. The wheat in the ground looks fine; never better than at present.

I have complied with your circular to the best of my ability. The estimates of crops are as near the average as possible. Some farmers' wheat will average 20 bushels to the acre, but the common average is about 15 bushels. Farming is carried on so loosely, as a general thing, in this county, that it is impossile to arrive at the exact truth in regard to the matter.

PORTAGE COUNTY.

The Eighteenth Annual Fair of our Society was held at Ravenna on the 6th, 7th, 8th and 9th days of October, 1863, and I regret to say proved any thing but a success. The weather, like that on the two preceding Fairs, was extremely unpropritious, which, of itself, aside from other causes, would have ruined any exhibition. Prior to the Fair everything looked encouraging. The entries were unusually numerous, especially in stock of all kinds, and our Directors felt sanguine that our Society was about to resume its youth. The result, however, has proven the fallacy of our hopes, and we now have become convinced that the insurmountable obstacles to our progress must be removed, or the Society must disband. These obstacles are, first, township societies; second, a rival county society; third, jealousy toward us among the old members and officers; and fourth, the close proximity for the past two years of the very successful and interest absorbing "State Fair."

Indeed it seems to us, who have labored so long and so arduously to keep the breath of life in the old institution, that our labor has been in vain, and that the Portage County Agricultural Society may now be considered in "Articulo Mortis."

However, a new Board may succeed in bringing it back to life. May success crown their efforts. The number of the present members is eighty-four.

PREBLE COUNTY.

The Preble County Agricultural Society held their annual fair on the 29th and 30th days of September and 1st and 2d days of October, 1863. It was with no bright prospects of great success that the managers of our Society decided on holding a fair the past season, but after full consideration it was thought best for the interest of the Society and good of agriculture to go through the forms of an annual fair, as a failure would not be so bad as no effort at all, and we might be successful.

The number of entries was large in most of the departments on our fair grounds, and there seemed to be quite a healthy interest manifested by the produc[illegible]

ticultural departments, as also in fine and fast horses, large hogs, and fine, long and middle-wooled sheep. And then the ladies were with us with flowers, preserves and preserved fruit, sugar, molasses and honey, wines, jellies, jams, needle, shell and wax work, and all the thousand-and one fine things so necessary in getting up a good display at a fair.

The weather was fine on the two first days of our fair; the third we had rain without cessation from early morning until night—a clear loss of at least three hundred dollars to us was that rainy Fair day; the fourth day was pleasant and the fair closed to the satisfaction of all, and everybody said it was good for us to be there.

The past season was one of unusual drouth in Preble county. The wheat, oats and flax seed were a good crop, fully an average; corn potatoes and sorgho, a poor half crop.

When this accursed rebellion is put down, and peace dawns upon our country, we can have a fair financially successful—an improvement upon what we used to have.

PUTNAM COUNTY.

The Eighth Annual Fair of the Putnam County Agricultural Society was held on our fair grounds, at Ottowa, September 29th and 30th, and Octobler 1st, 1863. The attendance was good, considering the distracted state of our country, political excitement, and the fact that there were two regimental musters in our county on the first day of our fair.

The Board having adopted the rule requiring all entries to be made on the first day, consequently a great many were deprived of the privilege of competing for premiums. The exhibition of horses was good; the showing of cattle better than last year, although not so many, but of finer quality and better breed. In sheep and hogs there is a decided improvement. Farmers are becoming convinced that it is cheeper to raise good stock. Of the breeds of sheep the French Merino is the most popular with our wool growers.

The principal crops of this county are wheat, rye, oats, corn, buckwheat, hay, &c. Owing to the dryness of the season wheat was light and the hay crop short. Oats was light in some localities, partiularly on clay soil, were much injured by "yellow midge," or lice. Corn was badly injured by frost, and not over half a crop.

Of fruits we had a good showing for the season of apples, pears, peaches, grapes, etc.

Potatoes—crop light. There were, however, a few specimens of sweet and yam potatoes that excelled anything we have seen in this latitude.

The ladies' department was filled up with fancy and the more substantial household and manufactured articles, and to their enterprize must be attributed a good share of the success of our Society the present year. Our Society is in a prosperous condition, notwithstanding a large number of its friends are in the army. During the past year the balance due on the grounds of the Society has been paid, and a good substantial hall, 25 by 60 feet, has been built, and some other minor improvements have been made.

We are out of debt and there appears to be an increasing interest manifested by a class of farmers who have heretofore taken no part in our fairs.

RICHLAND COUNTY.

No awards were made for improvements in agriculture and household manufactures.

As to the condition of agriculture in the county, the Board are of the opinion that our farmers every year are farming better and more in accordance with scientific principles.

SANDUSKY COUNTY.

Our Twelfth Annual Fair was held on the Society's grounds, at Fremont, on the 7th, 8th and 9th days of October. The weather being very unfavorable, the attendance was not so large as usual. Number of members, 251. There were about three hundred entries made in the different departments. The show of horses was good, and a creditable improvement manifested. Owing to the cold, wet weather, there were but few cattle exhibited, but they were of the best, Short Horn and Devon, with good grades, which marked an improvement in that department. The show of sheep and hogs was not large, but of desirable blood. The poultry interest was represented by the exhibition of a few good specimens. The farm and garden products exhibited in Agricultural Hall were very creditable to the exhibition. Our new Mechanic Hall presented many fine specimens of mechanism, farm and household implements, etc. Floral Hall was handsomely fitted up, and was the receptacle of fine specimens of fruit, household fabrics, paintings, drawings, fancy work, etc., etc., but owing to the early frosts the display of flowers was quite small.

Corn, buckwheat, potatoes and other late crops were injured considerably by the frost.

SENECA COUNTY.

The Seneca County Agricultural Society held their twelfth annual Fair at Tiffin on the 30th of September and the 1st and 2d of October, 1863.

The weather on the 1st and 2d days was very unpleasant, which caused the Fair to be less successful, financially, than heretofore. There was, however, a fair attendance, and a medium number of entries.

Although there was not so much interest manifested in the last annual Fair of our society, we are satisfied that the lack of interest in this department was caused by the same being directed to the prosecution of the war, and in endeavoring to supply the wants and alleviate the sufferings of the brave men in the Union army.

The principal agricultural productions in our county are wheat, oats, corn, hay, clover-seed, wool, horses, cattle, swine and poultry. The yield was an average crop in wheat, but in consequence of the drouth the yield of corn, oats and hay was light. There was very little complaint of injury to crops by insects.

SHELBY COUNTY.

The fourth annual Fair was held at the grounds of the Shelby County Institute on the 23d, 24th, and 25th days of September, 1863.

The managers have so improved the grounds and track that it will compare favorably with any grounds in the State.

The entries this year were 635, showing an increase over former years. The premiums awarded were 286.

The exhibition of field crops was very good for the season.

The show of horses was very fine, showing a gradual improvement in that line.

The show of cattle was not as good as the interests of the county would demand.

The show of hogs was large in quantity and good in quality.

The exhibition of Merino sheep was hard to beat; we now claim that Shelby county can show as good sheep as any county in the State, and I will here state that eight hundred dollars

was offered and refused for a spring lamb on exhibition at our Fair, and we have more of the same quality.

The mechanical department showed an improvement over former years.

The fruit on exhibition was very fine; the specimens showed by J. C. Coe & Co., of pears, peaches, and grapes, would be hard to beat at any Fair, and was the best advertisement for their trees and vines possible.

The crops in Shelby county were not near an average. The wheat, though of excellent quality, will fall short one-third. Corn, owing to the drouth and early frost, will not average over half crop. Oats was also very light, and was attacked with a red kind of lice, which gave many of the fields a red appearance. Potatoes, not over half crop, and generally small, and in portions of the county the vines were destroyed with the bug. The prospects for a good crop of wheat next season is good, as it was generally got in in good order and has grown well.

STARK COUNTY.

The thirteenth annual Fair of the Stark County Agricultural Society was held on the 7th, 8th, 9th, and 10th days of October, 1863.

The officers had some hesitation about holding a Fair this year on account of the excitement in the country, but we have abundance of proof of the unabating interest felt by our people in agricultural exhibitions, notwithstanding the first day opened with a drenching rain, and continued almost without intermission until the close of the Fair.

The number of entries was a little less than usual, but the attendance was very good, and we had every promise of an unusually large and interesting exhibition, until the rain set in and cooled the ardor of many on their way to the grounds.

On the second day notice was given of a continuance another day, but the fourth proved little better than the previous three, and we closed up in a pouring rain.

Our principal crops are wheat, corn and oats, although we raise a fair proportion of rye, barley, buckwheat, meadow grass, flax, sorghum, etc. Our yield of wheat the past season would reach an aggregate of 400,000 bushels, from less than 24,000 acres. There was no insect troubled our fields of wheat the past season—the weevil, having for the past few years played sad havoc with this grain, have now nearly disappeared. Our oats crop yielded better than in 1862, in which year we had an aggregate of 276,688 bushels, from 8,902 acres, or a trifle over 30 bushels to the acre. Corn was very severely injured in the northern portion of our county by drouth, and late corn was damaged by early frosts, yet on the whole we shall not fall far short of last year's crop, which was 369,131 bushels from 10,074 acres. Buckwheat was nearly a total loss, by frost; not being extensively raised, its loss is scarcely felt—our aggregate, in bushels, for 1862, being only 1,081. Of grass lands we have about 30,000 acres, yielding 40,000 tons of hay; was damaged severely by drouth. We manufactured from 100 to 120,000 pounds of maple sugar and probably 10,000 gallons of sorghum molasses. Potatoes are a good crop, yielding about 100,000 bushels in the county annually. Of butter we manufacture 700,000 pounds; cheese, 132,000 pounds, its manufacture being confined to three or four townships.

Never in the history of this county have agriculturists endeavored more to better their condition financially and intellectually, so that by these important aids they can more successfully prosecute their vocation. Although war, with its attendant evils, has drawn largely upon all classes of society, yet none feel it less than our farmers. Machinery, to a great extent, has supplied the scarcity of labor, and, under the stimulus of ready sales at high prices, our farmers have put forth renewed efforts, thus benefitting themselves financially, and aiding materially in furnishing winding sheets for rebels, and for rebellion a grave deep, even beyond resurrection.

TUSCARAWAS COUNTY.

The Fourteenth Annual Fair of this Society was held on their grounds, near Canal Dover, on the 6th, 7th, 8th and 9th days of October, being one day longer than advertised, on account of rain during the first day.

The fair, in some departments was very creditable, and the attendance was very good. The sheep department showed a decided improvement, and would compare favorably with the State Fair in quality—Spanish being the variety at the head of the list.

There was 487 entries, and $437 in premiums drawn. Total receipts, $692.93, which was duly distributed on premiums and indebtedness.

TRUMBULL COUNTY.

The Trumbull County Agricultural Society held its fair on September 29th and 30th, and October, 1st, 1863. Our specimens for crops were not competed for. Our show of stock and vegetables were good. Our Society is in a prosperous condition.

UNION COUNTY.

The Union County Agricultural Society respectfully submit their annual report for the year 1863.

There were no competitors for premiums on crops at the last Fair.

The Society has not been so prosperous the past year as it was some years since; but is determined to struggle on, with the confident hope that with returning peace it will again prosper as formerly. The Society has done much to improve the agriculture of the county; and there is before it a wide field for future usefulness. When farmers come to appreciate the usefulness of such Societies all thought of their going down may be given up. Every observant person has marked the great change that has taken place in the country in a few years as to the position of farmers in society. Formerly they were scarcely recognized by polite society as fit for their associations. Now they stand in the very front ranks of society. Agricultural Societies have done much to produce this change; and if farmers would maintain their present position in society, they must sustain these organizations. The vanity which was formerly so common of living without work, or making a pretence of doing it, has given place to a noble emulation to be known as the most skillful worker in some branch of useful or elegant labor. That labor is not disgraceful may now be considered a settled public sentiment. If this desirable state of things is to be made permanent, those who labor should regard it as a matter of course that they are to devote a few days every year to sustaining those means which give dignity to industry. If they do this, agricultural fairs will soon be regarded as indispensable; and to this view of them should the public mind be educated.

The number of members of the Society is about two hundred.

The principal crops have been so frequently stated in these reports, and vary so little from year to year, that the shortest possible statement will now be made. The principal crops are hay, corn, wheat, oats, and potatoes; and they stand in importance as here named.

The past season has been one of extreme drouth, which greatly damaged the hay, corn, oats and potatoes, and other summer crops. Wheat was comparatively light owing to its having been frozen out. A frost in July destroyed some fields of corn when about as high as a horse's belly. Another frost late in August greatly damaged all the corn of the county.

There has been no special damage to anything by insects.

Our county is fast improving and increasing in population. The Atlantic and Great Western railway enters the county near the northeast corner and passes southwesterly through the county for more than twenty miles—most of the way through the woods. This will open up a very fertile tract of land, and add greatly to the facilities for shipping produce.

WARREN COUNTY.

The Twelfth Annual Fair of the Warren County Agricultural Society was held on the 24th, 25th and 26th of September.

The Board has no statements of competitors for premiums on crops and other improvements in agriculture, as there were no entries made for the same the past year.

The Board has nothing of interest to report in regard to the proceedings of the Society. The Society numbers about 800 members, being quite a decrease from former years, owing partly to the excitement of the day, and chiefly, as growing out of this excitement, the failure to hold a Fair the two previous years. The prospects of the Society are, nevertheless, favorable to progress and usefulness, and the Board flatter themselves that the next annual report will exhibit a degree of prosperity equal to any former year.

Corn, wheat, barley, oats, hay and potatoes, are the principal crops of the county. Approximating to these are sorgho and tobacco, and these are engaging the attention of farmers with an interest increasing every year. The following is a fair estimate of the amount of some of the crops raised the past year, together with the average yield per acre, to wit: Corn, 16,-500,000 bushels, average yield 40 bushels; wheat, 550,000 bushels, average yield 14 bushels; barley, 68,000 bushels, average yield 29 bushels; hay, 14,500 tons, average yield 1¼ tons; potatoes 55,000 bushels, average yield 70 bushels. Of sorgho and tobacco the Board are unable at present to give the product. The previous season was characterized by drouth in the early part, causing late planting, and, in many cases, a replanting. The latter part of the season was favorable until the remarkable frosts of August and September made their appearance, which resulted in damage to the corn, tobacco and sorgho crops.

WAYNE COUNTY.

The Fourteenth Annual Fair of the Wayne County Agricultural Society was held at the fair grounds, near Wooster, on the 7th, 8th and 9th days of October, 1863. But owing to the incessant rains for a number of days before and on the first day of the fair, our exhibition bid fair to be an entire failure, it raining so hard on the first day that neither officers or exhibiters went to the fair grounds—but fortune favored us on the second day, the clouds comparatively dispersed, and the second and third days proved more favorable. Owing to this circumstance the entries were not up to the expectations of the managers by about one-half. The membership was also much diminished, the sale of family tickets did not exceed fifty per cent. of the previous year. The transient visitors were diminished in like proportion, consequently our receipts were very meager. The managers were fearful that the efforts of 1863 would leave the Society considerably in debt, but we now hope, with economical management of the fiscal concerns of the Society, with what little surplus there was in the treasury, to be able to discharge all legitimate claims against the society.

The present board of managers do not by any means feel discouraged as to the future success of the Society, on account of our comparative failure this year, as it was wholly on account of the inclement weather, as the members and citizens, prior to the rains, manifested more than their usual interest in the welfare of the Society.

The articles on exhibition were up to the standard of other years in quality; in many articles there seems to be a decided annual improvement, more especially in horses, mules and sheep, sharp competition having grown up between the producers of those classes of stock.

The mechanical interest is fast gaining ground, and is being developed more and more every year.

The principal crops raised in this county are as follows: Wheat, corn, rye, oats, potatoes and grass.

Wheat—the leading article—a medium crop; a good quality of grain; injured by drouth in fall of 1862, and frosts and wet in the winter of 1863; average yield would not exceed fifteen bushels per acre.

Corn—a light crop, being injured by drouth in early part of the season, with early frosts in the fall; the yield is light and quality rather inferior; average yield about thirty-five bushels per acre.

Hay crop light; injured by early drouth, early in the spring; yield will not exceed 1¼ to 1½ tons per acre—was put up in fine condition.

Oats was injured by spring drouth and insect; yield 28 to 30 bushels per acre.

Barley was injured in like manner; yield about 25 bushels per acre.

Sugar cane was considerably above an ordinary crop, but was materially injured by early frosts; the quantity of syrup was somewhat above other years, but the quality was not so fine. The production of this article is materially on the increase.

Potatoes—a fair crop; quality good; average yield would, perhaps, reach 125 bushels per acre. Other articles of vegetables somewhat below the usual average, owing to the dry weather that prevailed throughout the entire season.

The exhibition of apples was much in excess of other years, the varieties being much increased and the quality improved. Our county bids fair to become one of the leading fruit growing counties, included in the backbone range.

The peach crop was short, but there was some very fine specimens exhibited.

Pears—there has not been that attention paid to the cultivation of this fruit that its value demanded. The last few years, however, are directing more attention to the culture of that delicious fruit.

Grapes are now attracting considerable attention. Almost every individual in town and country are supplying themselves with grapes, of the finest and best varieties; many of which are producing the finest specimens of most delicious fruits.

Strawberries, the production of which only a few years since, was entirely unknown in this county, has now become the common inquiry, "How are your strawberries doing?" the reply is, generally, "Doing well;" while almost every family can boast of the delicacy and luxury of strawberies and cream; besides, considerable quantities are produced for sale.

Other fine fruits are gaining rapid favor in their production.

There was no competition for premiums on field crops this fall.

The membership this year only reached 216. The Society feel gratified with their former and present efforts; being out of debt, while owning their small, yet beautiful fair grounds, of eight acres, within the corporate limits of Wooster, worth, perhaps, about $4,000.

WILLIAMS COUNTY.

The Eighth Annual Fair of the Williams County Agricultural Society, was held at Bryan, on September 30th and the 1st and 2d days of October, 1863.

There was not much competition the past year on field crops at our fair, bnt there is evidently an increasing interest manifested in our county in the proper management of farms, and in the cultivation of field crops. Notwithstanding we are living in a time of war, and that is *the*

great subject of interest to the whole people, yet we think there has been as much interest as could be expected in the exhibition of agricultural products at our fair.

The Society now numbers 178 members, and the prospects of its usefulness and prosperity is as encouraging as it ever has been since the Society was organized.

The principal crops raised in the county for the last year are as follows:

Wheat, a fair average crop, and but little complaint of injury from insects, and will average not far from 15 bushels per acre.

Corn, a very light crop, much injured by the early frost, which occurred on the 30th and 31st of August; average amount per acre not far from 20 bushels, and mostly poor at that.

Grass, light average, not more than 1 ton per acre.

Oats, not extensively raised, and less than an average crop.

Fruit—there is beginning to be more attention paid to the cultivation of fruit in our county and vicinity, and the past year there was a fair average yield.

Barley, not much raised, and below an average crop.

Sorghum was quite extensively planted, but was almost a total failure, on account of frost.

Potatoes, not an average crop; caused by the dryness of the season.

WOOD COUNTY.

The Twelfth Annual Fair of the Wood County Agricultural Society, was held in Bowling Green on the 2d and 3d of October, 1863. The weather on the first day of the fair was inclement in the extreme, which caused the exhibition on said day to be a comparative failure.

The morning of second day was also quite unpleasant, but still there were a respectable number of entries, considering the weather and condition of the roads. Our county is developing in its resources quite rapidly, and there is an increasing interest manifested in every department of agriculture.

The greatest cause of this advance and interest is attributable to our fine ditches, or artificial water-courses, leading into the streams, or natural out-lots. Our portion of the State is a uniform level surface, having an average descent of about seven feet to the mile—soil a deep vegetable loam and a clay sub-soil, containing a large proportion of lime. Some years ago these lands were considered wholly unsuited to the growing of wheat and other cereals, but now since the water can be successfully kept from remaining on the surface, it produces finely and abundantly all kinds of grain.

The stock, grain, vegetables, &c., exhibited at our fair, were unusually good, but not as large or numerous in collection as heretofore.

But the most attractive department was that of fruit—especially the apples. I think time and observation will demonstrate that the Northwestern portion of the State, will excel in most kinds of fruit—more particularly in apples, pears and grapes.

This prediction is not based on the fact that our portion of the State has taken the 1st premium in apples at the last two State Fairs, but on the known adaptability of our soil and climate to the successful growing of these fruits; and to the general deep interest our people take in the culture of fruit.

The exhibition of fruit at the State Pomological Society in Toledo, which closed its annual meeting to day, is admitted by members from all parts of the State, to be the finest ever made at any meeting of the society.

Our membership is only between 65 and 70, but we think there is annually good results to be seen from our efforts.

There is nothing worthy of note in crops of past season in this county. Wheat was about an average yield, hay rather light, corn badly injured by the frost of Aug. 30, and sorghum nearly all destroyed by same.

WYANDOT COUNTY.

Our Tenth Annual Fair was held at the Fair Grounds on the 5th, 6th, 7th and 8th days of October, 1863. On the first day we had about the usual number of entries, and felt very much gratified over the prospect of a fine exhibition; but as all human expectations are liable to be disappointed, so were ours. On the morning of the second day it commeneed raining, and continued wet, cold and very disagreeable during the last three days, so that it was impossible for people to attend. The consequence was, our fair was a failure. We have a rule by which any citizen of the county, paying one dollar into the treasury of the society, becomes a member thereof, and as there were but seventy of those this year, we only have seventy members.

We had no competitors for premiums on field crops. There was about the same breadth of wheat sown this year, as for the last few years, say 20,000 acres, with an average yield of about 12 bushels per acre, or an aggregate of 240,000 bushels. The principal cause of its failure was on account of its freezing out in the month of March. Corn, there were perhaps 25,000 acres planted, with not more than one-third of the average yield, say 10 bushels per acre, or an aggregate of 250,000 bushels, worth 80c per bushel. The principal causes of failure were the frosts of July and August, and the dry weather. Oats, a small crop, not over 4,000 acres sown, average yield per acre 16 bushels. Drouth, cause of failure. Rye, about 300 acres sown, with a yield of 20 bushels per acre. Buckwheat, 150 acres sown, yield 5 bushels per acre—$1 per bushel. Hay, 18,000 acres, 4-5 ton per acre—$15 per ton. Potatoes, 600 acres, 70 bushels per acre—75c to $1 per bushel.

HORSES—Not as much improvement in the last few years as might or should have been, though we have a few very good breeding horses.

CATTLE.—There has been great improvement in this stock in the last few years, and yet there is room for much more. We have a good grazing county of land and would like to see our prairies dotted over with herds of Durham's as the hills of Kentucky are.

SHEEP.—Reports of State Fairs for the past few years will show that our county is wide awake on the sheep business. There appears to be a desire on the part of the wool-growers to increase the size of their flocks on account of the high prices paid for wool here last season, which was from 70c to 80c per lb. Spanish Merinos are preferred here, being considered the hardiest in this latitude; and on account of the weight of their fleeces—3½ to 5 lbs. being about an average.

HOGS.—There has been a decided improvement in swine—the Chester Whites, Russians and Leicester's being preferred.

A more general interest is now felt in agricultural matters by our people than ever before. The scarcity of laborers has been instrumental in turning the attention of our farmers to the use of labor-saving machinery, more or less of which can now be found on nearly every farm in our county; such as drills, mowers, reapers, corn planters, hay pitchers, hay rakes, &c.

Therefore we report the condition of agriculture to be flourishing.

INDEPENDENT SOCIETIES.

THE UNION AGRICULTURAL SOCIETY.

The Union Agricultural Society was formed in September, 1855, consisting of the following townships: Twinsburg, Hudson, Solon, Northfield, Aurora, Streetsboro, Bedford, Chagrin Falls, and all other townships within five miles of the center of Twinsburg.

It is situated in the corner of four counties, Cuyahoga, Geauga, Portage, and Summit, twenty miles from the location of any county society.

Said society was incorporated Oct. 13th, 1863, and holds a deed of eight acres of land near the center of Twinsburg, (at which place all fairs are to be held,) with suitable buildings, horse stalls and cattle pens. The officers of the society consist of President, Vice President, Secretary, Treasurer, and one Director from each township included in the society.

Number of members, 303. Number of entries for last year, 546. The society is in a very prosperous condition, and bids fair to future usefulness, situated as it is in one of the best agricultural and dairy districts within the State. The principal crops raised are wheat, corn, oats, barley, and potatoes. It is also well adapted to fruit. During the year 1863 the amount of cheese shipped from the above named townships was 26,031 tons; butter, 328 tons; nearly all of which was made within the district. Number of horses owned, 2,600; cattle, 16,000; sheep, 21,000; killed by dogs, 200; swine, 2,180; mules, 20. Amount of wheat, 26,294 bushels; rye, 271 bushels; barley, 378 bushels; corn, 93,592 bushels; oats, 46,855 bushels; buckwheat, 200 bushels; potatoes, 25,043 bushels; hay, 23,000 tons; maple sugar, 133,025 pounds; maple syrup, 1,279 gallons; sorghum, 1,000 gallons.

UNION AGRICULTURAL SOCIETY OF WELLINGTON, LORAINE COUNTY.

This society embraces some ten or twelve townships; taking in the south part of Loraine west part of Medina, north part of Ashland, and east part of Huron counties. It was organized nine years ago, four or five townships combining at first, and a membership of about 150. It has been steadily increasing in territory, number of members, and in the amount of receipts.

Our eighth annual Fair was held September 30th, October 1st and 2d, 1863, and was entirely successful. Total number of entries, 1,066. Amount of receipts, $1,034. Number of members, 513. The board of officers seem determined to spare no effort to make the society highly beneficial to the farmers and mechanics in the vicinity.

The season was very dry, and what crops were planted yielded but poor returns, in consequence of the drouth and early frost. This part of the country is principally engaged in grazing, and generally but little grain raised. Many fat cattle, sheep, and hogs are annually sent from here. Many farmers are engaged in dairying, and large amounts of cheese and butter are made, which brought high prices the past season. Wool too is becoming a staple production. There has been a great increase in the number and quality of sheep this year. The future prospect for farmers never looked brighter.

STATEMENTS OF FARM CROPS.

Boston Township, Summit County, Ohio, ss.

Edmund H. Cole, being duly sworn, says he accurately measured the land upon which H. V. Bronson raised a crop of potatoes the past season, and the quantity of land is half an acre, and no more.

EDMUND H. COLE.

Sworn to before me this 17th day of December, 1863.

MERRILL BOODEY, J. P.

Boston Township, Summit County, Ohio, ss.

H. V. Bronson, being duly sworn, says that he raised a crop of potatoes the past season upon the land measured by Edmund H. Cole, and that the quantity of potatoes raised thereon was 197¾ bushels, and no more, measured in a sealed half bushel, and that the statements in regard to the manner of cultivation, etc., are correct, to the best of my knowledge.

H. V. BRONSON.

Sworn to before me this 17th day of December, 1863.

MERRILL BOODEY, J. P.

I take the liberty to make a statement to the State Board of Agriculture of the growing of potatoes I have entered for premiums. In January, 1859, John Mackull, an Irishman, who worked for me a few years previous, made me a visit, (he was then in the employ of James H. Godman, of Marion,) and among other seeds gave me two large potatoes, requesting me to plant and take good care of them, as Mr. Godman had them recently brought from Tennessee, where they had been highly recommended to him. I cut the two potatoes and made four hills; found they were good to yield and for table use. From what seed I saved in 1859 I raised six bushels in 1860; in 1861 I had over 60 bushels, my other kinds being nearly a failure; I used and sold so many that in 1862 I only had seed enough to plant one-fourth acre, them I took good care of and allowed no weeds to grow with them, and had 87½ bushels. I have now grown this kind of potatoes five seasons; there has been no rot among them; very few small ones; scarcely any hollow; keep sound and healthy till July or August, and are ready sale to those who have used them and depend on buying. I could long since sold all I have raised this season, at the highest market price, if I wished. I do not know what name they go by, so I wrote to Mr. Godman, on the 4th of November, 1863. * * * I have entered these potatoes at the Fair; I wish to know of you what they were called when you got them in Tennessee; if you do not recollect the name, I propose to call them the Mackull potato, in memory of our old friend, John Mackull, the Irishman, who was very fond of potatoes and too fond of whisky for his own good, as I understand he was killed on the cars last year, on his way to Cincinnati, as one of the celebrated Squirrel Hunters, to repel the then threatened rebel invasion of that city.

Yours truly,

H. V. BRONSON.

EXPENSE OF CULTIVATION.

To 10 one horse wagon loads manure, 20 cents	$2 00
" Ploughing, harrowing and making ground, 1 day	3 00
" 5½ bushels seed, 75 cents	4 13
" Cultivating twice 1 day, (½ day each time)	2 00
" 8½ days, harrowing twice	12 00
" use of grounds (if it should be let)	5 00
" 5 days, digging and getting potatoes in cellar	6 25
	$34 38

The land being my own, I have set down in the above expense, account of $5 for use of land. All of the labor done as above, except ploughing and harrowing, was done by myself and boy, I have set the price what our labor was worth here this past season.

The soil is gravelly loam and has been in use for the past thirty years; have put on from five to twenty loads of manure the past ten or fifteen years.

I put on five and a half bushels seed, cut so there were but from one to three eyes to a piece, in drills three and a half feet apart, seed ten inches apart; planted 12th and 13th of May. They were cultivated and hoed the usual way twice. I possibly may have consumed six or eight days through the season pulling weeds from the rows and hoeing between them, as I let no weeds grow among the potatoes. There was thirty rows in all. I carefully saved all the small potatoes on these rows, (which were all of a length) and got 2 pounds 6 ounces, which were too small to cook.

George Manchester, of Madison, Lake county, being duly sworn, says that he raised a crop of potatoes the past season upon the land measured by N. E. Steward, and the quantity of potatoes raised thereon was 127 bushels, no more, and that the statements in regard to the manner of cultivation are correct to the best of my knowledge.

GEORGE MANCHESTER.

Sworn to before me this 20th day of November, 1863.

W. T. SIMONDS, J. P.

STATEMENT OF COST OF RAISING A HALF ACRE OF POTATOES BY GEO. MANCHESTER.

A sandy soil; no manure. Planted 20th of May.

Plowing	$1 00
Once hoeing	1 50
Harvesting	2 00
Marketing	2 00
Variety peach blow, one piece in hill, three bushels	75
	$7 25
Sold 114 bushels, 50 cents	57 00
Profits	$49 75

GEORGE MANCHESTER.

N. E. Steward, of Madison, Lake county, being duly sworn, says he accurately measured the land upon which George Manchester raised a crop of potatoes the past season, and the quantity of land is one-half acre, and no more.

NOBLE E. STEWARD.

Sworn to before me this 20th day of November, 1863.

W. T. SIMONDS, J. P.

COUNTY SOCIETIES—OFFICERS, ETC.

County.	President.	Treasurer.	Secretary.	Place of Fair.	Time of Fair.	Receipts.	Expenditures.
Ashland			W. B. McCarty	Ashland	Oct. 7, 8, 9		
Ashtabula	Hon. Abel Krum	N. E. French	E. F. Abell	Jefferson	Sept. 2, 3, 4	$1,030 58	$865 02
Athens	George Putnam	H. T. Brown	W. J. Bawden	Athens	Sept. 24, 25	593 10	597 05
Belmont	William Hardesty	James A. Rinker	John Dunham	St. Clairsville	Sept. 22, 23, 24	399 90	318 40
Brown	Jackson Dugan	F. J. Phillips	James H. King	Georgetown	Sept. 8, 9, 10, 11	919 37	916 57
Butler		G. W. Tapscott	D. G. Leigh	Hamilton	Oct. 6, 7, 8, 9	5,043 26	2,605 97
Carroll	J. L. Harsh	Wm. Thompson	R. Raley	Carrollton	Oct. 8, 9, 10	290 00	
Champaign	N. H. Harr		John T. Zombro	Urbana	Sept. 29, 30	1,792 98	1,736 89
Clermont	John H. Branch	W. C. Dole	M. E. Means	Olive Branch	Sept. 1, 2, 3, 4	738 10	622 44
Clinton	C. Linton	William Crumly	L. C. Walker	Wilmington	Sept. 9, 10, 11		
Columbiana	Dennis Harbaugh	B. W. Pritchards	B. F. Nichols	New Lisbon	Sept. 23, 24, 25	1,462 63	1,602 57
Coshocton	William Batchelor	Matthew Johnston	M. C. McFarland	Coshocton	Oct. 14, 15, 16	3,155 67	2,734 03
Cuyahoga		William Waterman		Cleveland		652 83	1,007 32
Delaware	Robert McKinnee	C. B. Paul	J. D. Van Deman	Delaware	Sept. 30, Oct. 1, 2		
Fairfield		D. Sifford	U. C. Rutter			1,058 40	926 42
Franklin	Jared Forsman	John M. Pugh	C. S. Glenn	Columbus	Sept. 8, 9, 10, 11	2,110 22	2,000 93
Gallia	A. P. Rodgers	L. P. Maguet	Jno. T. Entsminger	No Fair			
Geauga		George B. Weaver	P. Hitchcock	Burton	Sept. 9, 10, 11	1,062 80	894 86
Greene	D. McMillan	Wm. F. Pellham		Xenia	Sept. 8, 9, 10	855 00	800 00
Hancock	B. B. Barney	Henry Ryal	D. B. Beardsley	Findlay	Sept. 30, Oct. 1, 2		
Hardin	I. C. Stevens			Kenton	Sept. 30 Fair closed		
Harrison	Eli Peacock	Samuel George, jr	Jacob Jarvis	Cadiz	Sept. 30, Oct. 1, 2	1,727 12	1,896 64
Huron	Giles Boalt	Charles A. Preston	Geo. W. Knapp	Norwalk	Sept. 22, 23, 24, 25	3,854 13	3,850 80
Jackson	Greene Thompson	B. Kahn	J. A. Sell	Jackson	Oct. 1, 2	349 78	306 61
Lake	George Anderson	C. L. Hoyt	M. L. Root	Painesville	Sept. 30, Oct. 1, 2	1,302 02	1,168 88
Licking	James Pittsford	Thomas J. Davis	A. Adair	Newark	Sept. 30, Oct. 1, 2	1,334 75	
Logan	James M. Kauffman	F. D. Prouty	Wm. Lawrence	Bellefontaine	Oct. 6, 7, 8, 9	633 04	648 42
Lorain	N. B. Gates		R. G. Horr	Elyria	Oct. 6, 7, 8, 9	1,081 63	986 25
Lucas		G. Norton	William Rawle	Toledo	Sept. 29, 30	1,040 44	668 62
Madison	Robert Armstrong	Peter Peetrey	Harford Toland	London	Sept. 9, 10, 11	579 30	477 75
Mahoning	George Pow	Hosea Heaver	F. C. Nesbit	Canfield	Oct. 6, 7, 8		
Marion	E. Messenger	A. D. Woolley	H. M. Ault	Marion	Oct. 21, 22, 23	381 32	283 50
Medina	Wm. H. Witter	S. J. Hayslip	H. G. Piper	Medina	Oct. 20, 21, 22	991 84	903 12
Miami	W. B. McClung	C. H. Culbertson	G. W. Morris	Troy	Sept. 30, Oct. 1, 2	1,358 63	1,256 41
Morgan	John B. Stone	Ford Sill	H. Dunsmon	McConnellsville	Sept. 29, 30, Oct. 1	455 80	455 80

COUNTY SOCIETIES—OFFICERS, ETC.—*Continued.*

County.	President.	Treasurer.	Secretary.	Place of Fair.	Time of Fair.	Receipts.	Expenditures.
Morrow	M. F. Bartlett	....	C. E. Chase	Mt. Gilead	Sept. 30, Oct. 1, 2	$594 93	$555 32
Muskingum	....	James Buckingham	....	Zanesville	Sept.	4,073 95	3,412 98
Noble	Canfield Phelps	George Salladay	W. Van Meter	Sarahsville	Oct. 1, 2	106 00	....
Ottawa	William Johnson	James Hollinshead	Ira S. Dutcher	Port Clinton	Oct. 7, 8, 9	134 00	....
Paulding	Samuel Forder	W. N. Snook	F. S. Oable	Antwerp	Oct. 1, 2	41 00	37 25
Pickaway	Z. H. Perrill	John Boyer	H. B. Denny	Circleville	Sept. 30, Oct. 1, 2	909 70	803 70
Portage	Thomas Gorby	....	E. Spalding	Ravenna	Oct. 6, 7, 8, 9	....	....
Preble	H. W. Dooly	J. S. Morris	James Albert	Eaton	Sept. 29, 30, Oct. 1, 2	668 88	641 00
Putnam	M. C. Ewing	....	David McCurdy	Ottawa	Sept. 29, 30, Oct 1	308 05	273 50
Richland	A. C. Welch	H. P. Davis	Henry C. Hedges	Mansfield	Sept. 29, 30, Oct. 1	925 21	926 18
Sandusky	Daniel Capper	Theo. Clapp	O. W. Vallette	Fremont	Oct. 7, 8, 9	579 51	533 81
Seneca	....	A. G. Sneath	J. H. Pittenger	Tiffin	Sept. 30, Oct. 1, 2	833 26	748 74
Shelby	J. A. Wells	....	J. A. Lamb	Sidney	Sept. 23, 24, 25	811 00	811 00
Stark	D. Lind	J. A. Saxton	W. H. Alexander	Canton	Oct. 7, 8, 9	....	....
Summit	H. P. Cannon	J. H. Wise	J. P. Alexander	Akron	Sept. 30, Oct. 1, 2	1,710 74	1,442 26
Tuscarawas	W. C. Deardorff	Geo. B. Deardorff	E. S. Slingluff	Canal Dover	Oct. 6, 7, 8, 9	692 93	....
Union	R. D. Reed	E. L. Reynolds	C. S. Hamilton	Marysville	Sept. 23, 24, 25	701 18	549 93
Warren	Lewis G. Anderson	....	George W. Frost	Lebanon	Sept. 23, 24, 25	1,102 86	999 76
Wayne	George J. Troutman	John McClellan	Anthony Wright	Wooster	Oct. 7, 8, 9	859 06	716 07
Williams	Wm. N. Noble	Jacob Youse	A. F. Bement	Bryan	Sept. 30, Oct. 1, 2	555 08	589 80
Wood	....	John Bates	James W. Ross	Bowling Green	Oct. 2, 3	187 85	....
Wyandot	T. V. Reber	N. J. Tailor	Curtis Berry, jr	Upper Sandusky	Oct. 6, 7, 8	371 73	246 55

ESSAYS, ETC.

[From the London Farmers' Magazine.]

BREEDING HORSES.

A LETTER ADDRESSED TO THE RIGHT HONORABLE JOHN EVELYN DENISON.

BY W. DICKENSON.

My Dear Sir: You have asked me to give you an outline of my experience in breeding horses, with special reference to my success with the cart stallion I imported from France, to the intent that it may be published in the Royal Agricultural Society's Journal. If you think anything I can state will be interesting to the members of the Society, I shall have great pleasure in complying with your request. I have been engaged with every class of horse from the winner of the St. Leger down to the horse walking the cart, and purpose to make mention of them all, except the race-horse, which I shall merely notice so far as he exerts a general influence for good or for bad upon our horses at large. And first permit me to address some general remarks to those members of the Royal Agricultural Society who have had less experience than myself, and beg the indulgence of readers who may think that I enter too much into the detail of a subject with which they are well acquainted. It is necessary to consider, before beginning to breed horses, whether the land designed for it is fit for the purpose of breeding sound, healthy animals. If it is, the starting point is right—you have reason to hope for success; if it is not, it is far wiser not to make the attempt, but to buy in and sell out as quickly as is convenient. It is thoroughly well known that sheep bred upon wet, undrained, boggy soils, have defective constitutions; they have diseased livers, decayed feet, and inferior wool, and are so thoroughly unsound in many instances that they die in great numbers without remedy. Horse-breeding may be attended with similar risks, which should be steadily kept in view. Horses should be bred upon a dry subsoil to make them

sound in constitution, sound in wind, and sound in color, by which I mean that whatever be the horse's color, it should be a deep, not a faint one. The surface, moreover, should be fertile, abounding in carbonate and phosphate of lime, to grow horses of full size, with plenty of bone and muscle. Upon this subsoil and this surface, you may expect sound, full-sized, healthy animals. A wet, spongy, clay soil produces delicate constitutions, defective wind, pale colors, and large flat feet. If your land is not dry naturally, perhaps it can be made so by effective drainage; if it cannot, do not attempt to breed horses—every kind of disappointment will follow such a course. Neither are a very dry subsoil and very dry surface desirable, for these produce small animals with narrow, contracted feet. The next step is to procure good mares to breed from; these should not be used because you have them, still less because they are unsaleable, but should be bought for this especial purpose, and selected with great care. I should advise their being bought in the autumn of the year, when two years old off, to be put to the horse in the following spring. I advise this because they are all brought to market at that time, the choice is greater, they are purchased at less cost, they are more free from defects, and also breed much better. They have never been made up, but are brought direct from the grass fields, which is very important as to soundness of wind and limb. No one has ever tried to breed from them, and sold because they fail to do so; if they are unsuccessful in your hands, you can part with them at five or six years old, most likely at a profit. It is important to have made up your mind fully what kind of horses you propose to breed before you begin to select the mares. They must be the very best of their kind, with the best action, and free from all defects of wind and limb. Such animals as are roarers, or who have curbs or curby hocks, spavins or splents, are unfit for the purpose. The toes should point in straight lines; they should not turn outwards, and had better not turn in. The feet should be of moderate size, not round, but of an oval shape. Convex soles are particularly to be avoided. The excess of substance should be on the side of the mare, she should be made useful on the farm; the blood on the side of the horse. Where elegance of appearance and speed are to be combined, or either to be had, it must come from the thoroughbred side. Weight and substance come from the cart, but elegance and pace from the blood. There is no substitute for blood where pace and continuance are required.

As I have begun saying something about the stallion, I will just observe with what care breeders of cattle select their bulls, not only looking well at every line of their bodies, but at every feature of their faces; their width, the length, their color, and their touch must be approved, and even

their ancestors for many generations are taken into consideration. Rams are just as closely inspected. In both cases the action must be good; they must stand straight upon their legs, and be able to move with ease to themselves. Breeders of horses would do well to use as much care in selecting stallions for their mares, but I am disposed to think they do not. It is not unusual to avoid the trouble, and put the mares to some convenient horse. Economy sometimes suggests that "this horse is only one or two pounds, he is just as good as the absent one, whose price is perhaps double." Another very important feature is to be observed. Breeders of cattle and sheep keep their best females to breed from—the better they are the longer they are kept; with horses, the better they are the sooner they are sold, not even the very best young mares being reserved for the stud. Those that cannot find a customer are too frequently kept and bred from; it is not an unusual saying with disappointed breeders, "If I cannot sell her I will put her to the horse." Great advances have been made in the breeding of cattle, sheep and pigs, in every part of the United Kingdom during the last forty years. What is the case with regard to horses? Have they not retrograded in the same degree? Can the present race of horses be compared with those bred forty years since? The cart-horse, perhaps, is the only class that can bear the comparison. There is a cause for all this, which I shall mention hereafter.

Here I close the general remarks, and proceed to mention the cart-horse I imported from France, with the result of my practice. I fancy some of my readers saying, "what induced you to buy a French horse? Could you not find one good enough in your own country?" My answers to those persons is, yes, I could, and did so. I bought what I thought, and others thought too, a splendid horse; I bred from him, and so did my neighbors, very good horses; and I should have continued thinking there were no better cart-horses in the world than the English; but in 1855 I went to the International Exhibition in Paris, where I had sent some short-horned cattle. There my attention was attracted to a class of horses I had never seen before. I looked at them and was astonished, seeing them drawing great long carts, as long as the English wagons, loaded with immense blocks of stone (not as ours are loaded in London, with two or three blocks,) walking nimbly away the whole day from the pit to the building. These immense loads of stone made me think of the three or four dray-horses drawing at a much slower pace a few butts of beer through the London streets. These horses, walking so nimbly with these great loads of stone, were not so fat as our own favorites, but they seemed to me to be doing twice the work. Although leaner, they bore the strictest scrutiny; the more I saw of them the more I admired them. Meeting Mr.

Jonas Webb, I called his attention to them. He said he had never seen such before; he had observed a horse taking into the show-yard an immense load of provender for the cattle, that astonished him beyond measure; he had resolved to try to buy him, but he lost sight of him that day, and never saw him afterwards. I thought them so superior to ours, that I resolved to buy one to take home. Very much to my disappointment, I could not find one young enough and good enough to buy. I saw them every day at their work, but none for sale. I went through all the dealers' stables without succeeding. I furnished myself with all the information to be obtained as to fairs on my way home; to some of which I went, and found, just as at our common small horse fairs, not a good horse in them. I happened to stay a day at Rouen, when the pavement of the bridge was up, over which great loads of goods had to be drawn to the quay; there again I saw these horses coming with their great loads of goods, which they could not draw through the mud more than a few yards at once, drag themselves almost to the ground, and I never saw one refuse to draw again and again. This confirmed by resolution to have one of them; so I made an arrangement with a principal dealer in Paris, and in 1856 bought the horse I call "Napoleon," which Mr. Dennison has asked about. I have never once regretted the purchase. He has been worked on my farm ever since, almost always with mares. I have never had so good, quiet, active, and powerful a horse before. In no instance has he given us any trouble. He is unlike our English cart horse, for with great (16½ hands high,) and immense substance, he shows a dash of blood. He has an Arabian head, not small, but of fine character, well proportioned to his size. The neck is very muscular, and well turned, the shoulders large, very deep, without lumps on the sides, and oblique, such in shape as would not be objected to for a riding horse; the bosom open, the fore legs magnificent, and very short, with great bone, hard sinews, and with little hair upon them. His feet are perfect in shape, and perfectly sound in work; his back short rather dipped, round-shaped ribs, large loins, rather plain drooping hindquarters, very large thighs, low down, and tightly joined together, with prodigiously powerful clean hocks, and very short hind legs, well under him. We never have had a difficulty with the engine or thrasher, or with anything in the mud that Nap. could not extricate us from. His stock are as good and kind as possible. It is a saying with the men that Nap's colts need no breaking. My mares are small and active; the stock are considerably larger than the dams, but so cleanly that as foals they look more like carriage horses. I think the cart mares, to work and breed, should be of moderate size, from 15½ to 16 hands. They should be long, low, wide, and handsome, compactly made, with short back, arching down-

wards, and with wide table shaped loin. The legs should be short and clean, the bone large, especially behind. They should be good walkers, and as I recommend working the mares on the farm, the high stepping action must not be overlooked. The mares should not be put to the horse to produce foals before the grass comes on in May, when the work of the farm is very much abated, the mares can be spared for a short time, the grass will be convenient for the milk, and the weather warm for the foals. These will do well with the mares at grass (after being kept in a few nights,) till the autumn. I work my mares moderately up to the day of foaling, and I think it assists the operation; but they should not be put to snatching, distressing work. When the foals are weaned in the autumn, they must have shelter and be well kept. A few oats, cut roots, cut hay, and a little bran, will do well for them till they go to grass again in the following summer, during which time the colts must be castrated. In the winter they may again be kept in sheds. They should never be allowed to get poor. They will be useful at three years old, and do half the work of horses if kept in a cool, well ventilated stable. I have just read some observations made by Mr. Ruck, in the course of his recent lecture upon steam cultivation, delivered before the Royal Agricultural Society. He describes the inconvenience he has suffered from the illness of his farm horses, which appears to me excessive when I compare it with my own experience. I will therefore detail with some minuteness how I think such misfortunes may be avoided by gentlemen equally unfortunate with Mr. Ruck, who are compelled to employ horses in consequence of their farms being too small to allow of the use of Mr. Fowler's steam-tackle. With the aid of three illustrations, I will describe the stable in which the cart horse can live healthily, consume his food without waste, while the liquid manure is economized for the highest fertilizing purpose. The stable should not be less than eighteen feet wide, and of such a length as will allow a six feet standing for each horse. It should be ten feet high. The horses stand in a single row, and the harness is hung on pegs in the wall behind them. This width admits of thorough ventilation to the stable, without subjecting the horses to draughts. Each standing should be parted off by an upright post reaching from the ground to the ceiling rafter, placed three feet off from the wall at the horses head. These partitions should be closely boarded up three feet above the manger and hay crib, to prevent the horses quarreling about the food, and kicking each other. To each of these posts a bale, eight feet long and one foot eight inches wide, should be hung by a strong chain, to divide the standings, and suspended by another strong chain at the hinder end from the ceiling rafter. Each chain should have a hook and eye within reach, that may be readily unfast-

ened. This arrangement will leave a space of six feet opposite the head of each horse, available for feeding purposes. The manger for corn and chaff may be made two feet six inches long. It should be two feet wide at the top, one foot two inches at the bottom. The hay and straw, which should be cut into six inch lengths, will require a larger receptacle, which should be three feet six inches long, two feet wide at its upper part, and half that width below. It should be so constructed that while even with the manger above, it should reach to the ground, two feet above, which should be fixed to the wall a bottom, sloping to one foot above the ground in the front, where some upright opening should be cut, so as to admit of the escape of the seeds and dirt. At the top of this hay and straw crib an iron rack, with bars six inches apart, should be so hung as to open up and fall back against the wall to let the fodder be put in, and then be put down upon it for the horse to eat through. It should be so much smaller than the opening that it can fall with the fodder as it is consumed, by which means not a particle is wasted. The manger may be constructed of yellow deal, one and a half inches thick for the front, back, and ends; the bottom of slate, three-fourths of an inch thick. The top of the front and ends should be covered with half round iron, two and one-half inches wide, screwed on to project over the front outside a quarter of an inch, and three-quarters of an inch inside the manger. This prevents the food from being tossed out, and the manger being gnawed. A short post must be put up as near the centre of the standing as possible to support the manger, into which a large screw ring must be put to let the chain or rope of the headstall pass freely up and down without constant friction. The manger may be three feet six inches from the ground to the top; the hay crib of course the same height. The paving of the standings three feet six inches from the head, should be flat, then with a fall from both sides to the centre, where an angle iron drain of four inches wide from out to out, with a removable flat iron cover fitted to the inside of it, should be placed straight down the standing, with a fall into another larger cross main drain, ten feet six inches from the head, so placed as to carry away the urine from all the smaller drains into a tank outside the stable. This main drain so placed takes the urine from the mares, and has a loose cover also fitted to it, easily removed for sweeping out when necessary, perhaps once a week.

This system keeps the stable healthy, economises the urine, and the straw also—the latter very important where it can be sold or consumed as food. The width of 18 feet for the stable gives room for narrow corn bins, 3 feet high, so that each carter may have his horse's corn separate. The ventilation is the most important feature in the construction of the stable, upon it depends the health of all the horses, and, consequently,

their usefulness. No stable should be without a constant change of air, and no horse in it should feel the draught. The two ends of the stable may be so contrived as to effect this object in this manner: Take 12 feet from the head wall to the opening for the stable door; allow 8 inches for the two door posts, and 4 feet 6 inches for the door. This will leave 10 inches between the door-post farthest from the horses and the back wall. This space, from the ground to the top of the door, should be left open, and covered with strong rabbit wirework, which should be permanently fixed. The door should be 7 feet high, and cut into two parts, horizontally, at a height of 4 feet. The lower part may be kept shut while the horses are in; the upper 3 feet may be open or shut, according to the state of the atmosphere. Mine are seldom shut, except the wind is blowing heavily in; we then close that end. There is another communication with the outer air between the door and the ceiling. The opening may be 3 feet long, and so placed that one end is against the back wall. It should have zinc, perforated with a quarter of an inch hole, permanently fastened over it. This arrangement will keep the stable sweet and the horses healthy. I have no communication from the stable to the loft above for any purpose, as I have learnt by observation this promotes draughts which are highly injurious to the eyes. The stable should be ceiled, for the convenience of lime-whiting. Plenty of light should be admitted from the hinder wall, by narrow fixed windows here and there, made of slabs of strong glass, never to be opened. Windows opening in bad directions, and open sky-lights kill horses by wholesale. The arrangement I have described is suited for 10 horses. Where 18 feet cannot be had, 17, or even 16 may be made to do, by taking six inches from the width of the door, and the rest from the space between the door and the head wall. It is important that the water—of which cart horses are allowed to drink about as much as they like—should be exposed to the atmosphere at least six hours before they are allowed to have it; and they should never be allowed to drink until they have eaten something. The colic (commonly called gripes) is almost always occasioned by their taking large quantities of cold water into empty stomachs. Cart horses, more particularly than any others, are subject to greasy heels and farcy legs, the treatment of which I leave to the veterinary surgeon; but my experience has taught me that in almost all cases they may be avoided, by not allowing the farm-servants to wash them in the pond, nor in the stable when they return from their work. Neither of these operations would produce the disease if they were rubbed dry immediately; but as it is impossible to get this done, I have stopped the washing entirely. If the dirt cannot be rubbed off, I allow it to remain on and dry upon their legs. The adoption of this

system many years since has completely prevented the occurrence of those diseases. The temperature of the cart-horse stable should be as little above the external air as may be, to keep the inmates comfortably warm. You should never feel, nor smell, that you are in a stable. The working cart horse when turned out to grass in the summer, may have in the stable 8 or 10 pounds of bruised oats, mixed with a little hay and straw cut together into chaff; in the winter time, he will consume, entirely in the stable, of bruised oats, 10 pounds; of hay and straw, cut together, 7 pounds each; of cut roots, 28 pounds, given with the oats and chaff. This style of feeding will cost in summer about 11d. per day, for each horse, besides the grass, and 1s. 2d. per day in winter. When roots cannot be had, 1 pound of dry bran to each horse per day may be used instead. When horses work excessively, a small quantity of split beans may be given in addition, but I do not advocate this; I do not like beans for cart horses, and very seldom, indeed, give any. I have now done with the cart horse, with which, I am sure, I have severely taxed the patience of my readers, and proceed to another kind of draught horse, the like of which, I think I may safely say, there is not in Europe, if there be in any part of the world, the London carriage horse. I need hardly say how much I admire them; I feel sure everybody everywhere admires them as much as I do. It is the breeding of them of which I am to write, not of themselves. My observation and experience in breeding them induce me to think they are more surely bred, more easily sold, at an early age, with less trouble and more profit, than any other class. They may be bred, too, from mares that can do the work of the farm thoroughly well. The Cleveland bay, the Scotch gray, and the Clydesdale mare, put to the good thoroughbred horse, will all breed capital carriage horses for the London market. If the mares are well selected, and the high stepping action not overlooked, very valuable horses indeed may be thus produced. Where this is aimed at, more attention must be paid to fine heads and necks, than is necessary for cart use. Thoroughbred mares breed first rate horses, put to a good cleanly three-parts bred cart stallion. The young stock, intended to come out early, at three years old off, must not be neglected in their early keeping; if they are, force meat must be had recourse to, and then follow the strangles, distemper, roaring, lameness, &c., &c., which I need not parade before my readers, who are in some instances too well acquainted with them, without, perhaps, having ascertained the cause. Before concluding with draught horses, I must not omit to mention what appears to me an important guide in selecting horses for their different purposes. They all have either to draw or carry weight—two distinct purposes. The line of the vertabræ indicates to which of these purposes they can work with

advantage to themselves. If the backbone is arched downwards they cannot *carry* weight. If it is arched upwards they cannot *draw* weight. The horse to carry, should have the arch upwards, and the horse to draw should have the arch gently downwards; in other words, be rather hollow-backed. It took me a great deal of time and trouble to discern this, and I am anxious to impress it forcibly on my readers. I observed that my horses working in harness with low backs, were in good condition, and those with high backs, poor. I saw the fact, but for a long time could not ascertain the cause. What is the cause of this? is a question I put to myself as constantly as I observed it. At last the answer came—"The bridge that was so strong one way, was equally weak the other." I wish to illustrate this more clearly to my readers. The bridge arched upwards will carry almost any weight you can place upon it; turn it upside down and it can carry scarcely any weight at all. If the horse has to carry weight, and the backbone is arched upwards, it is in the position of the greatest strength. On the other hand, if the horse has to draw, the force brought into action will tend to press the spine upwards, and therefore a downward curvature is the most advantageous formation. Horses with high backs can not push heavy weights back for the same reason. The back-bone, already bent up, is forced upward still more, the arch is opened, and the power is lost.* The horse with a low back, if willing, can push back almost any weight, because the weight is pressed against the lower side of the arch, which being bent downwards, is strengthened by the pressure.

Should my explanation not appear clear to my readers, I advise them to put into the plow, side by side, a horse with a high back, and one with a low back, and observe whether the high back does not bend up higher by his work, and whether the low back does not remain in its fixed position. That which bends is weak; it cannot bear the pressure upwards. The horse would say at the end of his day's work, if he could speak, "how my back does ache!" The fixed position of the vertebræ indicates the power of the brute as well as the power of the man; the loose, wabbling back cannot endure in any animal.

The carriage horse is expected to make a fine appearance, carry his head high, his knee well up, and to rely entirely upon his driver where he is to go, to an inch. He is partly blinded by the winkers, and very much prevented seeing his way by the bearing rein. Not so the riding horse—his eyes are unmasked, his head at liberty to pick his way for himself and his master too. While the carriage horse is looking up to the drawing-room window to be admired by the ladies, the riding horse should be looking

* This is a mistake—the back-bone vertebræ, in either case, is usually straight. The curve or depression is occasioned by the different lengths of spinal processes. T. C. JONES

where his next foot is to be placed upon the ground, to give confidence to the rider. His neck should be lighter, and capable of being easily arched. It is very disagreeable to me to have a high, stand-up harness-neck before me. I prefer a light neck, not very long, and shoulders so long that as when I am on his back and he is a-trot, I can see his knee at work before. This gives the rider a good seat, and places the weight well back upon the horse where he can carry it. The hind legs should be well under him, the fore legs short, feet sound, the hips low and flat—wide, high hips are ugly and objectionable in all horses. It may be accepted as a rule that the horse that walks well can either trot or gallop well, not unfrequently both. The best hacks I have seen have been bred from good strong pony mares and thoroughbred horses. You cannot have too much blood in your riding horse; but less can be done with in the hack than in the hunter, in whom pace and endurance are wanted, besides particularly good wind, and so round action to accommodate himself to ridge and furrow, and carry his master safely home after the sport of the day. The same shape as for the hack is the perfection of shape for the hunter; but a little more length, a little more size, and not less than three parts blood, will be required to go in a good place with hounds, 15.3 to 16 hands is the perfection of size, and quite thoroughbred is the perfection of breeding. The back should be particularly good, the hind legs short and well under the weight to be carried.

The drainage of the stable of the cart horse, carriage horse, hack and hunter, can all be carried out in the same way with advantage to them all alike. The mangers and hay-cribs should be constructed as already described. Instead, however, of dividing the standings with bales, as with cart horses, it is better to have boarded partitions, inclosing stalls six feet or six feet six inches wide and ten feet long. The ventilation should be arranged upon the same principle, with a fixed amount of inlet and outlet, in addition to which another portion, under the control of the head of the stable, may be made available according to the variations of the atmosphere.

Horses doing fast work and light of flesh, will bear more warmth than those working slowly. The stable should never be without a change of air. The temperature should never be above 60° Fahr., except when the external atmosphere is above it. Every hunting establishment should have a hot water apparatus, a plentiful supply of water, and a bath-room to wash the horses in as soon as they return from the field. Loose boxes, sixteen feet square, are absolutely necessary in every horse establishment, some of which should be separated from the others for sick horses.

I have said something about the necessity of blood in the breeding of

horses, but, knowing what I do, I never think I have said enough. I have hinted at the great difference between the want of care and attention taken by the breeders of horses in their selection of stallions, as compared with that taken by the same class of persons breeding cattle, sheep and pigs, and think I have not overstated the truth. Every person who has seen the great change which has taken place in the quality of the animals produced throughout England, Ireland and Scotland (horses only excepted) will admit that the improvement of them is marvellous; while horses alone have become deteriorated almost in the same degree.

Why is this? It is because they have all had more care bestowed upon them; the production even of pigs has been more actively cared for than the breeding of thorough-bred horses (except by racing men for racing purposes.) It is simply because the breeders of the inferior animals, since the establishment of agricultural societies, have been well rewarded with prizes, while the best thoroughbred horses in England, the most important class to our national welfare, have been very much neglected. The prizes given to every class of bullock, sheep, and pig, male and female, of every age, have so far exceeded those given to thoroughbred horses, that the latter have not been worth competing for. That is not the only reason; there is another important one. It is that formerly the Royal Plates, of £100 each were given for competition, all over England for four year old horses carrying 10 stone 4 lbs.; five years old, 11 stone 6 lbs.; six and aged, 12 stone, and decided in four mile heats.* These prizes were a great inducement to breeders to endeavor to get horses of size and substance, and to keep them when got. As long as these Royal Plates were given to horses carrying these high weights, strong thoroughbred horses were bred and kept, which in the end broke down, and became the most valuable acquisition to breeders of horses in all parts of the country. Having become blemished, they were no longer desired by foreigners, and continued the remaining portion of their lives at home, helping to produce a race of horses with size, substance, blood, and action. From their stock the most valuable hunters, hack, and carriage horses were selected, and from the less well favored the cavalry was especially well mounted. Our horses were then the envy of the whole of Europe. These Royal Plates for high weights and long distances brought up our horses to this point of excellence; so long as they were so given, so long we kept our supremacy; but, by some unfortunate influence, the conditions were altered, and lighter weights and shorter distances allowed. From this point I date, under my own observation, the commencement of the deterioration of our thorough-

* This is 14 pounds to the stone.

bred horses, and consequently of those of every day use. I saw the commencement of the evil; I now see the consequence. There was no longer any inducement to breeders to retain their great strong two year old colts; they could not run at that age, neither could they at three years old struggle with moderate sized horses. The best horse ever produced in England could not race at two nor at three years old; he was not only the fastest and the stoutest of any period, but he was one of the most powerful; this horse was Eclipse. If he had been of these days, in all probability his fate would have been sealed at three years old; he would have been sold as a great slow brute to some foreigner coming among us to make such purchases at a small sum, as most of our large sized unfurnished horses have been, till there is hardly one left. Since there is nothing further to run for at four years old, they must be sold. I can speak positively from my own knowledge to this state of things; the alteration of these plates and other turf arrangements have combined to produce quite another class of race horse—a slippery, slender, small horse, that comes quickly to perfection, and as quickly passes away. The adoption of handicaps at all country races is another evil; nearly all the important races are handicaps, instead of weight for age. This tends to make all horses equal, and give to all, good and bad, an equal chance of winning; speed is substituted for substance; horses are tried at two years old for speed; if slow, they are cast, and the expense of training stopped. This promotes sport and produces betting; and therefore answers the purpose of sportsmen, but is ruinous to the national supply of horses. Sportsmen are anxious to make their own game; they do make it by these means, but the national interest is not served. The nation should take care that the nation's horses are not ruined by giving money to produce that end. The Royal Gifts were bestowed expressly with the national object of improving our general breed of horses, which was brought to a high state of perfection by the means used. The conditions of the plates were altered, we have failed in our aim, and now have two classes of horses—blood horses without substance, and strong horses without blood. Both are bad for common purposes. We want the combination of strong blood horses with the country mares of all kinds. We shall get it by retracting our steps and returning to the old plan—the Royal Plates for four year olds, 10 stone 4 lbs.; for five, 11 stone 6 lbs.; six and aged, 12 stone; not four mile heats, as of old, but one four mile race. This, I think, must be the starting point, if we are ever to recover our lost position, for fine strong blood horses. Nothing can be expected from turf arrangements, wretched as the system is, of making good and bad equal, and destructive as it is to the quality of our horses, it does promote sport and it does produce betting—

the final object of keeping race horses. It would be a great stimulus to the recovery if His Royal Highness, the Prince of Wales, (who well knows the value of blood in horses ridden across the country) were to add some Royal Plates for the same high weights, varying the distance to a race of three miles. The money given by lords, lieutenants of counties, members of parliament, and for town plates, should all be given with the national interest in view, and this would assist very much to expedite the improvement. This should be followed up by agricultural societies' prizes for these horses, as though they were of equal importance with cattle, sheep, and pigs; prizes should be given for thoroughbred horses of three, four, five years, and aged horses, such as have served mares during the season as country stallions, at a country price; blemishes should not exclude, but only lame feet, unsound wind, spavins and curbs, all of which may effect the rising generation. Prizes for geldings seem to me to be unnecessary, and can have no effect upon the object required. When a prize of £100 was given by the Royal Agricultural Society at Battersea, the best stallions were brought from all parts of the country, even a Derby winner, to whom was awarded the prize. Nevertheless the object of the society was not obtained. It is not a winner of the Derby or St. Leger—a horse that will never be taken from his own stable door—that should come to an agricultural show, exhibit himself there, and walk off with the prize; but it is a good strong thoroughbred country stallion that is available for the use of the ordinary mares of the country. The prize did, however, indicate a great fact, a hint suggestive of what may be done by the £100 prizes towards restoring our losses, and bringing us back again to our original position. It has illustrated the great principle that such rewards are highly esteemed by the owners of valuable horses, and will induce them to keep them to show for such prizes; and there surely is great need of them. The country is so ill supplied with thoroughbred horses that it is almost impossible to find a useful short legged thoroughbred horse that can carry 12 stone across the country. This loss is immense; there is no substitute for blood; there is no elegant carriage horse without it, no good quick stepping hack without it, and no fast, enduring hunter without a great deal of it. The anxious breeder, who knows the value of it, will say, "Where am I to find it?" I must admit that this is very difficult now; it was not so a few years since. Blood horses have been getting worse and worse.

Great studs of such animals were formerly kept, and many of them, too, in my recollection, all over Yorkshire, as well as in many other counties: they occasionally won a Derby, and not unfrequently a St. Leger. Those that were not so fortunate, carried their masters with hounds; car-

ried their masters' huntsmen and whippers, and made valuable country stallions. Those bred now are light, weedy, powerless and worthless in every national point of view. Our cavalry must feel this wonderful falling off. If they should be again brought to contend with some hostile power, it will be seen that although we have not lost the steel of our men, we have lost the energy of our horses. Let it not be overlooked that blood gives pace; pace is power. Blood carries weight; it is said that a thoroughbred horse carrying 32 stone for four miles, beat the best and strongest horse that could be found, not thoroughbred. Blood gives life; the thoroughbred horse lives longer in work than any other. Our horses have fallen off wonderfully since the battle of Waterloo; and those of our friends now, who were opposed to us then, have been improved as ours have been deteriorated. The Emperor of Russia also has so improved the horses of his Imperial Guard, that I believe he has 10,000 men better mounted than any 10,000 men in England, or anywhere else. The remedy is in our own hands. Let Her Majesty's plates of £100 be re-established for high weights and long distances; let the Prince of Wales throw his influence into the scales, and the nation follow the example—it is a national subject, and worthy of all the patronage that can be bestowed upon it. The Agricultural Societies of the United Kingdom should follow on with the Royal Agricultural Society, and call for weight carrying thoroughbred stallions. We may thus recover what we have lost, and again possess some useful animals, capable of doing good service to the country. Be it ever remembered that, however bad may be the horses available for the general use, those upon which the cavalry are mounted will be worse still; whilst if horses at large are better bred, the army will be better supplied. I have sent six mares fifty miles to a thoroughbred stallion that I saw at Battersea. I would advise the anxious breeder to look at those exhibited at the Royal Agricultural Show, with the view of selecting one for his purpose for the ensuing year; they are a few left, but they are few indeed. In conclusion, let me remark that most of the observations and opinions which I have expressed have not been adopted at random, as chance suggested, but have resulted from what may be called the statistics of the stable. It was my habit early in life to keep in the book for the year a detailed account of every horse I bought, his age, pedigree, color, quality, defects and native district, number him, and give him a name significant of the horse, as far as possible, to impress him on my memory. These were all entered when he was bought, and the chief incidents of his career were added from time to time afterwards. At the end of the year all these circumstances were brought together and formed a summary of the year's transactions, consisting of—

The horses bought in.

The horses cast and sold out; why each was cast and sold.

Those killed accidentally; how killed.

Those that died; the cause of death, and where.

At the commencement of the new year all those horses remaining in stock were re-entered by my own hand, in a new book, which stated in whose possession they were to be found, with every important particular attached to them for further observation. As the list always contained several hundred horses, a great mass of evidence grew out of it, which often forced upon my notice views which I had by no means anticipated. Such views, properly grouped and recorded, confirmed by subsequent observation, may be considered as the legitimate laws for the breeding and management of horses, based upon what our neighbors call the logic of facts. And here I mention one case in particular as to the comparative duration of life of horses. Apart from accidental circumstances, they live longer in the same kind of work, in proportion as they are employed at a pace below what they are capable of going. "Pace kills," is an old proverb, and is equally true as it is old. The cart horse, working in a cart, is old at 16, and dies out generally at about 20 years of age. The coach horse, doing the same work, is old at 20, and finishes his career at about 25. The race horse, working at the same pace will work till 30 and sometimes till 35 years old. Each class must be understood to draw weights in proportion to the weight of the horses. I note these circumstances because I consider, first, that the value of my opinions depends upon their origin; next, because I hope that others may be induced to follow up the same system of observation; and lastly, to give an instance showing how every careful record of facts becomes a substantial contribution towards the advancement of knowledge. If by my advocacy of this cause I should produce such a change in the system of breeding horses as to recover the size and substance of the thoroughbred horses of the last century, I shall have the pleasure of feeling I have done my country important service.

THE THEORY AND PRACTICE OF FEEDING.

BY STONEHENGE.

In adapting the quantity and quality of horse-keep to the wants of each horse, regard must be paid, *first* of all, to the small size of this animal's stomach, which affects all alike; *secondly*, to the work for which he is designed; and *thirdly*, to the peculiar constitution of each individual. From

the first of these causes the horse must never be allowed to fast for any long period, if it can possibly be avoided, it being found from experience that at the end of four hours his stomach is empty, and the whole frame becomes exhausted, while the appetite is frequently so impaired if he is kept fasting for a longer period, that when food is presented to him it will not be taken.

Previously to the introduction of railroads, harness horses were often required to do long distances in the day, and it was found that if the whole journey must be performed without stopping to bait, it exhausted the horse less to increase the pace up to nine or ten miles an hour than to dawdle over the ground on an empty stomach. If two horses are driven or ridnen fifty or sixty miles under similar conditions as to the weight they have to draw or carry, and the one is taken at the rate of six miles an hour, which will keep him fasting from eight and a half to ten hours, according to the distance, while the other has traveled fast enough to do it in six or seven hours, the latter will be less exhausted than the former, though even he would be all the better for a feed in the middle of the journey, the time devoted to this act being easily picked up by the increased energy which would be given by the corn. No horseman of experience is ignorant of these facts, and after a long day the hunting man who knows what he is about, will always be seen on the lookout for a feed of corn or a pint of oatmeal for his hunter, before he attends to his own wants.

The human stomach will bear hunger far better than that of the horse, and if the rider feels his appetite pretty keen, he may be satisfied that the animal which carries him is still more in want of food. The *kind* of *work* which the horse is intended for affects not only the quantity of food required, but also its quality. Thus very fast work, as in racing and hunting, strains the muscular system as well as the heart and lungs to the utmost, and therefore the food which is best fitted for the development of the former to the highest degree, consists of those kinds which present the elements contained in the muscular tissue in the *largest proportions consistent with the due performance of the digestive powers.* These are found in oats and beans. But nature herself teaches every animal instinctively to keep within such limits as are safe, and hence it is found that though every horse will greedily devour a peck or a peck and a half of corn daily, yet he will not go beyond this quantity, even though it is not sufficient for his wants, and in spite of his being deprived of every other kind of food. The demands of his muscular system are supplied by the corn, but there are certain saline matters in hay which are not found in the former, and being necessary for the performance of several important functions, the stomach receives its warning through the appetite, and no more corn is received

into it. On the other hand, the hard-worked horse, fed on hay alone, craves for corn, and will greedily devour almost any quantity put into his manger until he upsets his digestive powers, when the appetite for it ceases. It is found by experience that a certain proportion of hay and corn is best adapted to each horse according to the work he has to do, and his own particular constitution; so that in laying down rules for feeding, it is necessary first of all to ascertain what demands will be likely to be made upon the system. Few owners of carriage horses would like to see them driven to the door with their muscles showing the lines between them, as they ought to do in a race-horse when fit to run. Such a state of high training as will put the latter in condition would be impracticable for the former without wearing his legs out, and not only destroying his rounded and level appearance, but taking away the air of high spirit and life which tends so much to gratify the eye. Hence the feeding suited to give the one nothing but muscle is not fitted for the other, who must have more hay and less oats, as well as less work. So also in deciding upon the proportion, if any, of oats and beans, regard must be had to the amount of work which is demanded; for there can be no doubt that while admitting the good effects of beans in large quantities upon the severely tried cab or omnibus horse, they are injurious to the carriage horse, whose blood soon becomes heated under their constant use. *Lastly*, the peculiar constitution of each horse must be studied before it can be known whether the average quantity and quality of food which will suit the majority of horses doing the same kind of work, will be enough or too much for him. Some washy animals pass their food through them so quickly that they do not absorb from it one-half of the nutritive elements contained in it. These must be fed largely if they are kept at work, and those articles of food must be selected for them which have a tendency rather to confine the bowels than to relax them. Independently of this extreme case, it never can with certainty be pronounced beforehand what amount of food will keep an untried horse in condition; but in a large stable an average can easily be struck, and it is this quantity alone which can be estimated here. In the following pages, therefore, I shall give a description of the several alimentary wants of the horse, and then show in what proportions they are found in the varieties of keep which have already been described, so as to enable the horse master to make his selection according to circumstances.

All these substances are found in the blood, but the composition of this fluid does not enlighten us as to the wants of the system, because it is continually receiving and giving off its various elements. The blood of a horse fed on highly nitrogenized food, does not differ on analysis from that of another which has been kept on the opposite kind of diet. Physio-

logical research, however, tells us that muscle is chiefly composed of fibrin, and that every time a bundle of its fibres contract, a certain expenditure of this material is made, calling for a corresponding supply from the blood, which cannot be afforded unless the food contains it. Hence the badly fed horse, if worked, soon loses his flesh, and not only becomes free from fat, but also presents a contracted condition of all his muscles. And this science is confirmed by every day experience, and the fact is generally admitted that to increase the muscular powers of a horse, he must have a sufficient supply of nitrogenized food.

As I have remarked above, the nutrition of muscle requires fibrin, but in addition the brain and nerves must be supplied with fatty matter—phosphorus and albumen. The bones demand gelatine and earthy salts, and the maintenance of heat cannot be effected without carbon in some shape or other. But it is chiefly with nitrogenized food that we have to deal in considering the present question, there being plenty of the other substances I have mentioned in all the varieties of food which are not largely composed of fibrin. It may therefore be taken for granted that the hardly worked horse requires oats or beans, or both mixed together in varying proportions, together with such an amount of hay as will supply him with the starch, gum, sugar, fat and saline matters, which his system requires, while on the other hand, the idle animal does not use his muscular system to any extent, and therefore does not require much or any oats or beans. The following table exhibits the proportions of these various elements in the several kinds of horse food most frequently used in this country:

	Woody Fibre.	Starch and Sugar.	Fibrin and Albumen	Fatty Matter.	Saline Matters.	Water.
Oats	20	53	11·4	·6	2·5	12·5
Beans	14·5	40	26	2·5	3	14
Peas	9	48	24	2	3	14
Barley	14	52	13 5	2 5	3	15
Indian Corn	6	62	12	5	1	14
Old Hay	30	40	7	2	7	14
Clover Hay	25	40	9	3	9	14
Barley Straw	46	34	1·5	0	6·5	12
Oat Straw	50	31	1	a trace	5·5	12·5
Wheat Straw	55	27	·5	0	5·5	12
Bran	54	2	21	4	7	13
Linseed	9	35	20	20	6	10
Carrots	3	10	1·5	0	1·5	84

RACE HORSES are fed upon the best upland hay, of which about six to eight pounds are given to each, on the average, daily, and from fifteen to twenty pounds of the best oats; in some cases beans being substituted for

an equal weight of the latter. The quantity of hay varies according to the constitution, grass feeders being allowed less, and delicate, light carcassed horses more than the above. The limit to the oats is the appetite, the trainer taking care not quite to satisfy the horses, which would produce satiety and disgust, but giving him as much of this food as he can without this effect. One-third of the hay is given in the morning, after exercise, and the remainder at night. The oats are divided into four feeds, one being given the first thing in the morning, the next on coming in from exercise, the third at four o'clock in the afternoon, and the last at seven or eight in the evening, when the stable is closed for the night. Very little water is allowed in the morning, two or three "godowns" being all that is usually given, about half a bucket full on coming in from exercise, after the horse is dressed and fed, the same quantity in the afternoon, and a full allowance at night. Once a week, if required by the state of the bowels, a bran wash is given, but this is omitted when the time of trial is approaching.

The HUNTER is fed in nearly the same way as the race horse, the chief difference being that a little more hay is allowed, and consequently less corn. Few hunters get more than five or six quarterns of oats, and, indeed, there are not many which will eat more; for, in order that the appetite for this kind of food shall be as highly developed as in the race horse, the animal must have been reared on oats from the earliest period, which few hunters but those bred for the race-course have been. The allowance, therefore, is generally about ten pounds of hay, and five or six quarterns of oats, or five quarterns of oats and half a quartern of beans. The hay and corn are given at the same times as in the racing stable, and the water also in the same proportions. Gruel is given when the hunter comes home after a hard day, as it restores the tone of the stomach, after long fasting, better than oats, which, moreover, the exhausted horse generally refuses, till he has had something to give his stomach a fillip. A bran mash should be given once a week, or every ten days, unless there is a tendency to purge, when, of course, it is not wanted. No change of food is required during the hunting season, but after this is over, it is necessary to decide whether the hunter shall be turned out for the summer, or soiled in-doors. The advocates of the two precedings are warm in support of their several opinions, which will be treated of hereafter under the head of *summering*.

HACKS require from three quarterns to a peck of oats, and ten to twelve pounds of hay daily. The latter is given in two portions, one at night and the other in the morning, the former being divided into four feeds, which are put into the manger at six or seven A. M., ten A. M., four P. M., and seven or eight P. M.

In most stables some of the hay is cut up with an equal quantity of straw, into chaff, and of this about a peck a day is given with the corn, the object being to induce the horse to masticate it thoroughly. The plan is so generally adopted now that I need not insist upon its advantages, which may be accepted as indisputable. If these horses are much exposed to the weather during the winter and early spring, a few beans in place of some of the oats may be used with decided benefit, especially if they have been accustomed to them in previous seasons. It must always be remembered, however, that they have a tendency to produce inflammation, especially in the feet and eyes; and, therefore, in those animals which have a weakness in either of the organs named, beans should be carefully avoided. Generally speaking, hacks are of small size, and they do not, therefore, require more than an average allowance of food, on which footing I have calculated their hay and corn; but if it so happens that any of my readers have a hack of full size, he must make allowance accordingly. These horses are now very commonly allowed a water tank, constantly supplied with water, and in that case there is no necessity for doing more than to see that it is daily cleansed, and that the ball-cock acts properly. When they are watered from the bucket, the groom generally gives it them in moderate quantity early in the morning and in the afternoon feed, finishing with a full allowance at night. HARNESS HORSES are fed much in the same way as hacks, but if they are used for a close carriage, and are of full size, they must have more hay than I have named, by fully a quarter of a hundred weight weekly. PONIES may be kept with very little corn, one or two quarterns a day, according to size, being all that is generally allowed. They will eat from sixty pounds to seventy-five pounds of hay weekly, and they are as much benefitted by chaff as larger horses. FARM HORSES are treated very differently in different localities, independently of the various fancies indulged in by individuals; their work also being subject to great changes, according to the seasons, it is necessary to apportion their food in the same ratio. Again, it happens sometimes that oats or beans are scarce and dear, and the farmer, if he grows them, will be inclined to sell them and use some cheaper kind of food for his horses, or, if he has to buy, he will still more carefully look out for a substitute at a lower price. The following are the most usual modes of feeding these horses, as far as I have been able to ascertain:

Plan 1.—Adopted throughout the Midland counties.

	£	s.	d.
Weekly allowance per horse in November, December and January—			
1½ bushel of oats, 1 peck of beans, and 1 cwt. of hay, costing for three months.........	6	0	0
Ditto through February, March and April—			
2 bushels of oats, 1½ peck of beans, and 1 cwt. of hay, costing..........................	7	0	0
Ditto May, June and July—			
3 pecks of oats, 1 peck of beans, and vetches or lucerne, costing..........................	5	0	0
Ditto in August, September and October—			
1 bushel of oats, ½ bushel of beans, clover, pea straw, &c., costing..........................	6	0	0
Total yearly cost..	24	0	0

In districts where oats are scarce, bran or pollard is mixed with beans, and given as follows:

	£	s.	d.
Weekly allowance in the autumn quarter—			
1½ bushel of oats, 2 pecks of split beans, and 1 cwt. of hay, costing for three months...	7	10	0
Ditto in the winter quarter—			
2½ bushels of oats, 2 pecks of split beans, 56 pounds of swedes, and barley or pea straw, costing for the three months..	5	10	0
Ditto in the spring quarter—			
2½ bushels of pollard, 2 pecks of split beans, and 1½ cwt. of hay, costing....................	7	10	0
Ditto in the summer quarter—			
2 bushels of bran, 1 peck of split beans, clover, vetches, or tares, costing....................	5	0	0
Total yearly cost..	25	10	0

Sometimes cut straw, steamed potatoes, and the meal of oats and beans are given, as being the most economical kind of food. The horses are fed three times a day, each time receiving fifteen pounds of food, thus—

In the morning, at 6 o'clock, 4 lbs. of oat and bran meal, 11 lbs. of chaff. At noon, 3 lbs. of oat and bean meal, 12 lbs. of chaff. At night, 2 lbs. of oat and bean meal, 2 lbs. of chaff, and 11 lbs. of steamed potatoes.

In Scotland these horses are kept out of doors, or soiled in-doors till October, when they are put upon hard food, receiving 1 cwt. of hay and a bushel and a half of corn weekly till December, when the hay is replaced by straw, and the oats are reduced one-half. In February, 1½ cwt. of hay and a bushel and a half of oats are again given, and this is continued till June, when they are fed on grass with a small allowance of corn.

BEDDING.

The BED is generally composed of wheat straw, of which that thrashed by hand is by far the most durable, lasting nearly twice as long, if properly kept clean, as the same quality thrashed by machine. Barley straw is eaten by most horses almost as readily as hay, and, therefore, it is kept as fodder for farm horses and cattle. It is excellent for cutting into chaff, especially when there is much clover grown with it. Besides wheat straw, sand, saw-dust, tan, forest leaves and bean straw are used either where economy is studied, or for some particular reason. I shall, therefore, have something to say about each of these materials. WHEAT STRAW is by far

the most general material for the horse's bed, and in private stables it may be considered as the only one used. It should be selected for its length, and the size and stoutness of its stalks, taking care that it is quite dry, but not so much so as to be brittle. It is tied up in trusses, or "boltings," as they are called in the Midland districts, which weigh about 36 pounds each. Two of these ought to serve for a week, after the bed is once made, which will require from two to three trusses, according to the size of the stall or loose-box. Unless the straw is properly shaken up and smoothly laid, the horse is not made comfortable, but lies with uneven lumps under him, which he cannot scratch into shape like a dog. Hence, the good groom takes great trouble with his horses' beds, and having first laid the old litter smoothly all over the stall, as far as the back drain, he spreads on the surface with his fork either the cleanest part of the former night's bed, or a fresh truss, according to circumstances.

The straw should be raised against travis or wall on each side, so that the horse in lying down has his back protected by it, the sharp spinous processes of the vertebra being uncovered by anything but skin, and causing considerable pain when pressed against the hard wood or iron. The straw is also turned under at the lower end, so as to present a neat appearance to the eye, as well as to afford comfort to the horse. In the morning the wet and dirty parts are forked out, and the remainder turned back and pressed tightly under the manger, or it is put into some other convenient place where it can be dried, which latter plan is an excellent one in point of economy and comfort. When the litter is thus disposed of the whole surface of the floor is carefully swept, the dirt being shoveled back into the gang-way, and finally removed from the stable. A little clean straw is then thinly spread over the stall, and left with a level edge behind the heels of the horse, where natty grooms put a border of plaited straw. During the day the droppings are collected in a basket, and removed as soon as they are perceived by the groom, by which the litter is kept clean, and the hind feet of the horse are prevented from contracting foul thrushes, which many are apt to do if they are allowed to be constantly crammed full of moist droppings, as they often are by careless grooms. On the average of seasons country straw may be bought for about £2 per ton, in which there are about sixty trusses, each therefore costing 8d., and on the calculation of two trusses per week, the horse's bed will cost 1s. 4d., for that period, without estimating the value of the manure, which varies greatly. In the neighborhood of very large towns, where the supply of manure is greater than the demand, it is almost a drug, and will scarcely pay for the labor of removal, but in agricultural districts it is worth 5s. per ton, and then an arrangement is often made by the farmer to supply straw on condition of receiving back the manure made with it. It may, gener-

ally, be calculated that an allowance of one-third or one-fourth of the cost the straw may be made for manure, and the litter may then be estimated as costing 1s. per week.

Sand is said to answer very well as bedding, and to have the great advantage of keeping the feet cool. I have never seen it used, but I am told, on excellent authority, that, excepting in very cold weather, it is a very valuable substitute for straw. The fine dry sand of the sea-shore is that which is usually employed for the purpose, but inland sand would do just as well if collected and stored in a dry condition. It requires a well drained floor, the chief objection being that it clogs the openings to the drains; but if the iron gutters are used which I have described, they may be readily swept out, and there being none permanently covered, there is no difficulty whatever. Indeed, if the sand is changed as soon as it becomes saturated with moisture, which it ought always to be, the drains are not wanted at all; but occasionally it will happen that the urine falls in or near the gutter, and then it is an advantage to have them in working order. The sand is laid about six inches deep, and every day the soiled parts are removed, and fresh sand, in proportion, spread over all, so that a very neat surface is maintained. The cost in sandy districts is very trifling, but of course elsewhere the plan would be prohibited by the charge for carriage. When sand is thus used, the feet must be stopped with cowdung more frequently than in the case of straw, or they soon become hard and brittle.

Sawdust is seldom employed as litter, its cost being quite as great as and often more than straw. It is only in or near saw mills, where there is an unusually large supply of sawdust on the premises, that it can be used advantageously. During the summer months it answers well enough if laid down as I have described under the head of sand, but like that material is too cold for use in our winters. It has the disadvantage, as compared with sand, that it soon heats when wetted with urine, and ammonia is then given off profusely, so that great care must be exercised to change it as soon as it becomes soiled.

Refuse Tan is very commonly introduced as a bedding for horses while being summered, in the belief that it is much cooler to the feet than straw. It has all the disadvantage of sawdust, without the advantages of sand, and if the latter can readily be obtained, it should by all means be substituted for it. I have often seen a box in which tan had been left for week's without change, the groom expecting that it would retain the urine of the horse without decomposition, although his nose ought to have convinced him to the contrary. It is a capital material if it is kept dry, but every one who has seen the heat which is given out by it in a hot-house will

understand that it is not to be allowed to come in contact with fluid, and especially urine, or decomposition will quickly supervene. The cost is seldom more than that incurred in carting it, which will depend upon the distance from the nearest tan yard.

FOREST LEAVES are not readily procurable, except in some very few localities, and I may therefore dismiss them with the remark that there is no objection to their use with which I am acquainted. Ponies at all events may be comfortably bedded with them.

BEAN STRAW is far too hard and unyielding to make a comfortable bed, and if it must be used I should prefer cutting it into chaff rather than employing it in this way.

DRESSING OR GROOMING.

By the term dressing, is generally understood the purification of the skin which the horse requires. He is never in the highest health unless the pores are kept free from the scurf which forms on them whenever he sweats, and the object of the strapping which he receives at the hands of the groom is to get rid of this mechanical obstruction, as well as to brace the nerves of the surface by the friction of the brush or whisp. This dressing must be renewed daily, even if the horse has not been sweated, and each time that he comes in from work it is necessary to repeat it. The former operation is or should be conducted in the same manner every day, but the latter will vary according to the state of the animal when he comes in, that is to say, depending upon whether he has been sweated and is cool again, or if he is still wet, or has been in the rain with or without exercise enough to warm him, or lastly, if he has been ridden or driven through dirty roads or over a deep country. Each of these conditions will therefore require a separate consideration.

The usual morning dressing is commenced either as soon as the horse has done his early feed, or on coming in from exercise, if such is allowed or enjoined. The utility of grooming after work cannot be denied, for it would be absurd to contend that a horse coming in wet and dirty should be left in that state till the next day; but it is perhaps necessary to explain to the idle groom that it is not a mere polishing of the surface of the coat which is wanted, but a deep steady pressure of the brush into the roots of the hair, so as to remove all the scurf which collects around them and clogs the pores, through which the sweat ought to be allowed to exude freely. Practically it is found that an hour's good strapping daily not only gives a polish to the coat, but it causes the secretion of a fine oil, which has a tendency to throw off water, and thus may save the horse exposed to the rain from catching cold. Moreover, it certainly stimulates

the nerves so as to enable them to bear exposure to the weather, which would otherwise tell injuriously on an animal which is covered up with thick clothing in-doors, and stripped of everything, even of the long coat which nature gives him, when he is submitted to the "peltings of the pitiless storm."

When the horse is turned out to grass, he is washed by every shower of rain, and though his coat continues to look dirty on the surface, yet the skin itself is braced by the winds and cleansed by the waters of heaven. Not so, however, in-doors. Here his clothing keeps his coat short, and keeps up a continual state of insensible perspiration, the watery particles of which pass off through the woolen rug or serge, leaving the salts and animal matters behind, as is apparent on examining the internal surface of any clothing which has been worn for any length of time without washing, when it will be found to be lined with scurf and matted with oily animal matters. There are many drugs which will give a gloss to the skin, but they will diminish instead of increasing its capability to bear exposure, and hence their use is altogether forbidden by those who know their injurious effects. The horse which is little used requires dressing to take the place of exercise, and if he has plenty of good strapping, his coat will look like satin; but the hunter and the hack or harness horse, exposed to all weathers, must be carefully groomed and receive plenty of elbow grease, or his coat will look hollow and stand out like "the quills of the fretful porcupine," whenever he is allowed to stand for a few minutes in a cool wind.

The first thing which the groom does in commencing his morning's task is to turn the horse round in his stall, and fold the quarter piece back upon itself, so as to expose the whole of the fore-quarters. Then, taking his brush in the hand nearest the head, whichever side he begins with, he works away at the head and face till he has thoroughly cleansed those parts, carefully cleaning out the dust and dirt from the roots of the ears, where it is very apt to lodge, and continually cleaning his brush with the curry-comb in the other hand; next proceeding to the neck, he works at that part in the same way, turning the mane over to the other side, and then going to the shoulders, bosom and legs, and finishing off with a whisp of hay, slightly damped, instead of the brush. Having thoroughly worked at this half of the body, the horse is turned round in his stall, and the hind-quarters and flank treated in the same way, the clothing being removed entirely while this is going on. In the spring and autumn, when the coat is being shed, the brush should never be used, and the whisp alone should be depended on. Nothing spoils the look of the young coat so surely as the brush, except, perhaps, the currycomb; but this latter should not, under any circumstances, touch the skin of a horse when it is in the

proper order, and is scarcely necessary to forbid its use when the coat is being shed, at which time it would be positively cruel, as well as injurious to the appearance. The brush and whisp having effectually cleansed the skin, and given the hair itself a certain amount of polish, the finishing stroke is put to the dressing by means of the linen rubber, with the addition, in well managed stables, with the leather. Either or both of these in succession are suddenly passed over the surface in the direction of the hair of each part, and then the quarter-piece, or rug, as the case may be, is replaced, taking care to throw it highly in front of its proper place and then to draw it steadily backwards, so as not to disturb the proper position of a hair. The roller is smoothly put on, being first laid on the back double, and then the off side is turned over into its place, when the straps being laid hold of under the belly, it is properly tightened and the quarter-piece smoothed beneath it. This completes the dressing of the body, but there are several minor points still to be attended to. A clean sponge is squeezed out, and with it the nostrils, eyes, and arms sponged clean, and, if necessary, the mane is dampened, so as to enable the groom to comb and brush it smoothly down on its right side. The tail, also, is carefully combed out, beginning at the lower end if it is a full one, and not touching the top until the bottom is smoothly arranged. Lastly, the legs and feet are attended to, the stopping, or whatever may be in the latter, being picked out, the legs washed if stained, and then carefully rubbed dry. Many grooms, when they have white legs to keep clean, begin the dressing by washing them, and then putting on flannel bandages, they leave them on till they have done the body, when they are taken off and the legs rubbed with the leather and linen rubber, till they are quite dry, finishing with plenty of hand rubbing if they are at all inclined to fill. All this being done, the litter is put straight, and the horse is ready to have his second feed. A good deal of muscular exertion, and laid out in the right way, is necessary for the due performance of the groom's daily task. There is no royal road to make a horse's coat, when in work, really look well, and not less than an hour's hard strapping will suffice for this daily. White and light gray horses will take up even more time than this, as with all the care that can be exercised the thighs and legs will occasionally become stained by lying in the dung dropped during the night. Soap and water laid on warm, and well rubbed, will get rid of a great deal of the brown color left, and if it is not suffered to increase by successive layers, it may be removed with comparative ease. The slight tinge which remains may be got rid of by the aid of washer-woman's blue, a bag of which is to be dipped into clean water and the skin washed with this after the soap has been got rid of. A little experiment is required to ascertain the exact amount of blue, but one or two experiments will soon teach an intelligent groom.

Whenever a horse is wanted to go out, he must again be whisped over before his saddle or his harness is put on. The groom strips the whole of the clothes off, turns him round in the stall, and carefully clears all the dust away from the ears and head with the rubber; then, proceeding regularly backwards, the whole body is smoothed over, and the saddle and bridle or harness put on. Lastly, the feet are picked, and an oil brush is rubbed over the outside of the hoofs, to give them a neat appearance, when the pillar reins are buckled to the bit on each side, and the horse is left till he is wanted. Dressing after work depends upon the state in which the horse is returned to the stable, when he may be cool and clean, or in a profuse sweat still going on, or with his sweat dried in, or completely smothered with dirt, or wet from rain, but chilled rather than too hot; or lastly, when exhausted from a severe run or other hard work. When the horse returns cool and clean, the groom throws his rug lightly over his quarters, and, taking a bucket and brush, he proceeds to pick and wash out the feet, standing on the near side, with his back to the horse's head, so that he can use his left hand to hold the feet, and his right for the brush. If the legs are quite clean, there is no necessity for washing them at all; but most grooms do so as a matter of course, and if they are properly dried afterwards, there is no objection to the plan.

Hunters, and valuable horses of all kinds, are immediately protected by flannel bandages; but in ordinary stables the legs are merely partially dried with a rubber, and are left in that state till the horse is dressed over. If the work has been continued for more than four or five hours without feeding, it will be well to put on flannel bandages, and let the horse have a feed of corn; but, otherwise, it is better to finish the dressing first. The cloth being removed, a whisp of hay is taken in the hand, and first the head and neck, and then the body is dressed over, finishing off with the rubber, as previously described. The clothing is then put on, the legs thoroughly dried, the litter put straight, and the task is finished..

When brought in still sweating profusely, if the weather is warm, the horse must be led about in the shed *with the saddle on*, till he is nearly or quite dry; for if he is put into the stable before he is cool, he will break out again as badly as ever, and if the saddle is removed the back will become sore. A hemp halter is cooler and more handy than a head collar, and it is usually employed out of doors for all purposes connected with cleaning. In the winter this exposure to the air out of doors is not necessary, and, indeed, it would often be dangerous, the stable being generally cool enough to stop all tendency to sweat, even with a light rug on. At this season, therefore, after the legs are washed and the bandages put on—which they should whenever the horse is in a sweat—the dressing may be conducted

in the usual way, in the expectation which will seldon be disappointed, that at the end of half an hour's strapping the skin will have become quite cool, and will look all the better for the profuse cleaning which it has received by means of the watery fluid given off by it. A scraper will be necessary, which may be either of wood or iron, and with this all the superfluous moisture is at once scraped from the surface, which greatly facilitates the process of drying. Two men ought then to set to work, each taking a side and working first at the head, then gradually backwards. In this way no part is allowed to chill, and the moisture is removed as rapidly as possible.

In the use of the whisp the rubbing need not always be hard, and it should be chiefly against the direction of the hair till it is nearly dry, when the proper direction is again taken. There is a good deal of art in drying a sweating horse, and nothing but experience and practical teaching will give it. As a general rule, it takes two men nearly three-quarters of an hour to thoroughly dress a horse coming in profusely sweating, supposing the weather to be only moderately warm. In very hot weather such an attempt would be quite fruitless, and the only recourse is to wait patiently till the effects of exercise are abated sufficiently to allow of the ordinary clothing being worn. Experience soon tells the groom how soon he can venture to begin, and no rule can possibly be laid down which will supply the place of this valuable power. Even when the horse is taken in, he must not at first be clothed, but he must be dressed without any thing on him; and in summer he must often be left for some time afterwards in a naked state. When there is a good open yard, shaded from the sun, the dressing should be done out of doors, and when this can be managed, it may be commenced much sooner than in the stable, unless this is a very cool one. Slight muscular action, either by walking or in some other shape, is necessary to prevent congestion of the blood in the internal organs, but it matters not whether it is effected by simply leading the horse about, or by stirring him up, as is always the case in dressing even the dullest animal. In other respects there is no difference in the plan last described.

WHEN THE SWEAT IS COMPLETELY DRIED IN, the hair is full of powdery matter, which must be thoroughly brushed out before the skin will look well or the horse be properly dressed. To do this, nothing more is required than the use of the brush previously to the whisping over, but a good deal of time must be spent in getting rid of all the foreign matters left behind on the evaporation of the watery particles of the sweat. There is an amount of grease in it, which makes the powder stick to the hair, and nothing but hard labor will get it away. For this reason many grooms adopt the plan of washing their horses all over with soap and water when they come home

in this state; and although I prefer dry rubbing, I would rather have water used than let the skin remain full of dry sweat. A common water brush is generally used, or, if the coat is thin, a sponge will be far better. No time must be lost in the operation, and unless two men can be spared, the rug must be thrown on as soon as the water is scraped off with the scraper, and the skin is just partially dried. In this state he may be left for a few minutes, attention in the mean time being paid to the thorough drying of the head and neck, which can not well be clothed advantageously. These parts soon dry, for in washing them there is no occasion to wet the mane, which may be turned over to the other side while each is being cleaned, and the ordinary coat of the head and neck holds very little water. After they are made comfortable the cloth is turned partly back over the loins, and the shoulders, ribs and bosom are dried with the whisp and rubber, after which the whole is stripped off and the hind-quarters thoroughly dried.

A HORSE SMOTHERED IN DIRT is, by careless grooms, too often left to dry with it all on, and then it is brushed out; or, if idleness reigns triumphant, a besom is taken in hand for the purpose. Where the particles of mud are few and far between, and are already dry, or nearly so, there is no objection to their being removed by friction alone, but if they are wet and (as they generally are) in large masses, water must be used to get rid of them; and the whole of the legs, belly, flank and tail will often require a good slushing with a brush and water before the dirt is removed—the tail being placed in the bucket itself, if it is a long one, and thoroughly cleansed in that way. A scraper is then employed to get rid of the water; the legs are superficially rubbed and then bandaged, the clothing is thrown on, and the dressing may be commenced as usual.

IN CASE THE SKIN IS WET FROM RAIN, whether the work has been fast or not, it is seldom necessary to provide against a continuance of the moisture, for the chill of the rain will generally prevent any tendency to break out in a sweat. The horse is, therefore, at once taken into the stable, and, if very wet, he is scraped, after which he is rubbed over, and his clothing put on while his legs are being attended to, by washing, bandaging, &c. The dressing is then conducted as in the case of the horse coming in sweating in cool weather.

AN EXHAUSTED HORSE demands all the resources of the groom's art, without which he will suffer in more ways than one. An extreme case seldom occurs except in hunters, who require the greatest care to bring them round after a severe run. On coming into the stable, if their powers have been taxed to the utmost, and their ears are cold and drooping, the first thing to be done is to get these warm by friction; an assistant in the

mean time preparing some gruel, while another puts some warm flannel bandages on the legs. It is wonderful what a restorative is found in the friction of the ears, after a few minutes of which a moderately tired horse will look quite a different animal, evidently enjoying the process, and dropping his head to the hands of the groom with the most perfect air of enjoyment. Where, however, there is only one groom for the whole task, the bandages should be put on first—that is to say, as soon as the clothing is thrown on. Then the gruel should be given, and as soon as this is swallowed, the ears should be warmed by friction. No attempt at dressing should be made till the gruel is taken and the ears are warm; and if they cannot be restored to their proper temperature, a warm cordial of ale and spices should at once be given. Usually, however, there is no occasion for this, and after getting the stomach attended to, the skin of the body begins to recover its natural temperature, and the extremities become warm again. In the course of an hour the dressing may generally be effected, but no time should be lost in it, and the skin must not on any account be chilled. After it is done, a feed of oats and a few split beans may be given if the appetite seems inclined to return; but sometimes, when the exhaustion is excessive, no solid food can be taken with safety till the next day, and gruel, with cordials, must be resorted to as the only kind of support the stomach will bear.

BROOM CORN, ITS HISTORY, CULTURE, AND MANAGEMENT.

BY MITCHEL C. HOWARD.

The cultivation of broom corn has never been brought before public attention to any considerable extent. It forms, however, an agricultural product in the State of Ohio, amounting, probably, to as much in value as the production of flax. It would be difficult to approximate near accuracy in estimating the amount annually grown, as we have no official reports or tables on the subject. It is a native of India, and its introduction into this country is attributed to Dr. Franklin. He, it is said, discovered a seed while examining an imported whisk in the possession of a lady in Philadelphia, and from it planted in his garden sprung all our broom corn.

Difference of soil and climate has produced four varieties, separate and distinct of themselves, but will readily hybridize if cultivated together. They are generally known as the Common, Early Eastern, Sampson, and Dwarf. For general purposes the Common is preferable. The Early Eastern will come into market three or four weeks sooner, but it is smaller in size and yields less per acre. The Sampson will yield more pounds per acre, but its coarse, large size renders it objectionable to the manufacturer. The Dwarf possesses fineness and flexibility of fiber, thus adapting it for making brushes and fancy brooms, but its cultivation and curing is usually attended with much more labor than the other varieties.

Soil well adapted to Indian corn is likewise adapted to broom corn. Good soil is of course preferable. The best soil for it is a deep, alluvial sandy soil, such as is found on our first river bottoms. The ground should be freshly plowed and well harrowed, then drill in rows three and a half feet apart. The seed should be perfectly clean, and free from any fibers of the brush, as they will clog the drill. Four quarts of seed is sufficient to plant one acre. The space between the seeds should be about four inches; if planted on good strong land it will do well if closer together. About the time it begins to appear roll the ground with a heavy roller

this pulverizes the lumps, presses the fresh earth around it, and on some kinds of land will do as much good as once tending.

We often hear the remark, "it is so slow in starting," this is because it is then sending out its long roots and preparing for a more vigorous growth.

As soon as the rows appear plainly, go through it with a harrow made for that purpose, twice in a row, allowing it to go into the row, thereby loosening the earth and destroying the grass and weeds; there is not much danger of injuring the corn. Some will be covered up, but a boy with a steel-toothed garden rake will uncover it as fast as a man will harrow. The harrow used for this purpose should be made of solid, seasoned oak plank, triangular shaped, the sides three and a half feet, the base two and a half feet, set full of one-half inch iron or steel teeth, to the number of twenty-five or thirty. A rope attached to each side serves as a handle to control it.

The tool used the second and third times of tending is "Gibbs' Patent Cultivator," of which too much cannot be said in commendation as an implement for destroying weeds and loosening the grounds; it should be in more general use for the cultivation of other crops. The first time in going through the corn with the cultivator, set the teeth to throw the earth from the corn, as it will not bear much earth, go twice in a row, the closer the better. The next time of tending, which should be in a week or ten days, set the teeth to throw the earth towards the corn, this gives it fresh earth and covers up the smaller grass and weeds. If there are any larger weeds remaining at this time they should at once be removed. In two weeks more go through it again twice in a row with a good sized single shovel plow, banking up the earth around the roots of the corn, so it has plenty of nourishment for its future growth and maturity. The tending of the crop is in general at this time completed; we say in general, because it is impossible to prescribe one rule for all kinds of soil and seasons. The object must be to keep the soil free from grass and weeds, and in a loose, healthy condition. If the spring is wet, and the weeds have the advantage, hoeing, especially in the wet places, is almost indispensable. If the season is very dry, a constant stirring of the ground is very beneficial. Sometimes one tool is best adapted for this purpose, and sometimes another. An individual that cannot tell what is best to accomplish these ends without a written rule had better let its cultivation alone.

The proper time for cutting or gathering the brush, if the best market price is desired, is after the blows have fallen and before the seed passes into the milk. This secures the brush in the best condition, but the seed is then worthless. This method is generally used where it is cultivated on an extensive scale and shipped to the eastern market.

If the seed is made an object, it should stand until the seed passes into the milk, and the kernel attained full size, but not hardened. The brush will have lost some of its fresh, green appearance, but is, nevertheless, good and merchantable.

There are two methods used in harvesting: one, in which the value of the seed is disregarded, is to break over the tops of each row separately four or five feet high; the brush, when cut is immediately taken to the scraper, cleansed, and dried on scaffolds in sheds or barns. The scaffolds are generally constructed of lath 10 or 12 feet in length and laid successively one above another 8 or 10 inches apart, the brush spread on them to the depth of two or three inches. In this way the brush is kept straight from the time it is cut until deposited on the scaffold. Two sets of hands are required—one in the field, the other at the scraper. The process of drying the brush by means of kilns is now generally discarded, as it renders the fibres harsh and brittle.

The other method of harvesting, and by which the seed is preserved, is by breaking alternate handsful of two rows across each other at an angle of about 45°; this forms what is called a table on which the brush, after being cut, is laid to dry. The stalks should be cut six inches in length and stripped of husks at the time of cutting. If the weather is favorable it can remain out over one night—if it remains out longer, it is bleached and injured by the dew. It is not expected, however, to be perfectly dry when suitable for hauling in. It should be thrown promiscuously on scaffolds 2 or 3 feet apart in a well ventilated building. Great care must be taken that it does not heat from the moisture it still contains; if tolerably dry, it might be scaffoled 6 or 12 inches deep, but should be handled over once a day for two or three days. It can then remain until scraped, the process of which will be next described.

An expeditious and easy manner of scraping is by means of two wooden cylinders, 2½ feet in length by 10 inches in diameter, securely held by iron bands around each end. The teeth, 2½ inches in length, are made of wrought iron and a screw cut on the end by which they are fastened in the cylinder. The cylinders are made to revolve in opposite directions, and can, by means of belts, be attached to any ordinary horse-power or other machinery.

After the brush is scraped it is next baled. For this purpose a substantial frame is necessary 3 by 4½ feet around and 4 or 5 feet high. The frame is filled with brush laying the stems out at each end, it is then pressed down into as small compass as possible by means of iron or wooden screws, bound with wire, and is now ready for market.

It is an erroneous idea that broom corn exhausts land. Any crop culti-

vated for a number of years on the same soil will impoverish it unless enriched by manures or alluvial deposits. While the entire growth of Indian corn and other crops is removed from the field in which it is grown, the stalks and blades of broom corn remain upon the ground and are plowed under the following year. The decomposition of so large an amount of vegetable matter cannot fail to enrich and fertilize the soil. Thorough and repeated applications of manures, leached ashes, compost, etc., will improve the crop, and what crop will it not improve?

The yield of brush depends upon the soil, season, extent of cultivation, and varies from 350 pounds to 850 pounds per acre; 600 pounds is a fair, average yield.

The price of the brush ranges in this State from 4 to 9 cents per pound. In the eastern market from 6 to 12 cents. The price depends on the quality, quantity raised, and the amount in market. All these considerations are very liable to fluctuation. Its intrinsic value depends on its color, size, fineness and flexibility.

The seed of broom corn, when ripened and cleaned, forms a very important item in its cultivation. All kinds of stock will eat it readily; it is especially good for fattening sheep and when ground makes excellent slop for milch cows. It yields, in a fair season, from 40 to 80 bushels per acre, and weighs 42 pounds to the bushel.

Following is subjoined an account of the expenses of cultivating and profits of one acre for 1863:

To plowing, harrowing and rolling	$2 00	
" 4 quarts of seed at $1 00 per bushel, and planting	50	
" harrowing and uncovering	1 00	
" cultivating first time and hoeing	2 00	
" cultivating and plowing second and third times	2 00	
" harvesting	8 00	
" scraping and cleaning seed	4 00	
" rent of land	6 00	
		25 50
By 712 pounds brush at 7½ cents	$53 40	
" 60 bushels of seed at 40 cents	24 00	
		77 40
Total profits from one acre		$51 90

AN ESSAY ON THE VARIETIES OF SHEEP, AND SHEEP CULTURE IN OHIO.

(*Continued from Ohio Agricultural Report for* 1862.)

COMPILED BY JOHN H. KLIPPART.

THE GROWTH OF LUSTRE WOOL.

[From the London Farmer's Magazine.]

Wool had ever formed an important item in the receipts of the stock farmer. It had commanded of late years a very satisfactory price, and, in consequence of the cotton supply being interrupted by the fearful American war, it appears likely to do so for some years to come, and therefore it behooved them, as British farmers, to endeavor, by every means in their power, to increase the growth of that kind of wool which was likely to fetch the best price in the English market, other matters of course being considered. It must be the object of the British farmer to produce as much stock as possible—a subject which was to be introduced next month by their old and esteemed friend, Mr. Robert Smith. He would remark that there was no animal that would so well repay the attention of the farmer as the sheep. The gentleman who was about to introduce the subject for consideration that evening had had considerable experience, both of English and foreign wool, and no doubt they all looked forward to an interesting paper, and one from which they could derive most useful lessons.

Mr. ANDERSON then said: When some months ago a conversation on this important subject, the desirability of increasing the growth of lustre wool, took place between myself and a few members of this club, I little thought I should be called upon to write a paper in support of this proposition. I regret exceedingly that my time has been so occupied with my numerous business engagements that I have not been able to give that attention to the subject which it deserves. Indeed, had I consulted my

own feelings in the matter, I should have declined altogether taking the prominent position which I occupy this evening; but, knowing the importance of the subject, and the interest which has for some time been taken in it by the Bradford Chamber of Commerce, as representatives of the worsted trade, I could not refuse to collect a few facts together, in the hope that a discussion might arise which would direct the attention of the growers of English wool to the benefits which must result to themselves, the manufacturers, and the country at large, if the growth of this valuable wool is materially increased. I may remark that, though connected with a firm which consumes a large quantity of wool, I am not directly interested in the increased growth of Lustre wool, not being a consumer of this description of wool at all; yet I am well aware that the demand for this bright-haired or Lustre wool has almost exceeded the supply during the last few years, and I think from the gradually increasing price of this wool, (which I shall afterwards show) and from the weight of fleeces produced, it is a matter of great importance to the farmer to consider whether it is not for his interest to try and increase the quantity of this wool, and whether it may not be the most profitable article which he can grow on his farm. In looking through "James' History of the Worsted Manufacture," I find a great many curious regulations (made centuries ago,) for the protection and for stimulating the growth of our English wools. I hope I may not be considered tedious if I give a few of these quotations, to show the importance which has always been attached to the growth of wool in England. I may here remark that I have not been able to ascertain what was really the character of the wool produced in those early days, but my impression is that it was long-wool, from the style of goods said to be manufactured, and also from the want of competition there was in the growth of it with other countries. In the reign of Edward III., and again of Edward IV., a number of English sheep were, as a great boon, allowed to be transported to Spain to improve the Spanish breed, thus denoting that English wool was superior to Spanish wool. But very conclusive evidence on this point is given by Capmany, in a number of laws drawn up in the year 1438, and confirmed in 1493, by municipal authorities of Barcelona, for regulating the manufacture of cloth (woolen and worsted) from fine English wool. It appears that there were thirty of these regulations. The first prohibits the "mixture of another wool with the English;" others relate to precautions for "preserving the purity of the wool in shipping, &c." We are also informed by Capmany that in the fifteenth century fabrics made from English wool were sometimes sent to England. Considerable commercial intercourse existed between England and Spain in the middle ages, and Spanish merchants trading hither were

granted many immunities. Our early ancestors, the Saxons, had large flocks of sheep, and produced great quantities of wool, which must have been of fine quality, as it brought high prices; and it is fairly argued by Mr. James that they could not have consumed all the wool they produced, and therefore doubtless exported largely to Flanders, then distinguished for the variety and beauty of its woolen fabrics. In his quotation from Dr. Henry's History of England, vol. 2, book 2, chapter 5th, we learn "the fleece was, in the time of the Saxons, two-fifths of the value of the whole sheep." Macpherson, in his Annals of Commerce, vol. 1, page 288, says: "That there was an export, seems to be indicated by the disproportionate price fleece appears to have been compared with the whole sheep, and also from the high price of wool. From the earliest periods English wool has been remarkable for the length and fineness of its staple, and general adaption for clothing." To show that it was extensively produced, I may quote Matthew, of Westminster, an historian of the Norman period, who asserts that all the nations of the earth were kept warm by the wool of England, made into cloth by the Flemish manufacturers; and, however hyperbolical this language may appear, Mr. James justly says: "Unquestionably the duty on its export formed during the early periods of our history the principal source of revenue of the national exchequer." Dr. Whitaker, in his History of Craven, published in 1805, speaking of the value of wool towards the close of the twelfth century, says: "A sack of wool consisted (according to Spielman,) of twenty-six stones, each weighing fourteen pounds. A laborer then only received a penny per day, and an ox was worth about thirteen shillings and fourpence; whence it followed that at that time two and a half stones of wool would purchase an ox, whereas now, in 1805, a laborer will earn the value of a stone of wool in a week." The monks of Fountain's Abby, in the North Riding of Yorkshire, appear to have possessed large flocks of sheep in the Craven district. Those flocks furnished a large portion of the revenues of the monastery. It appears that to pay the heavy ransom of Richard I., one year's wool was borrowed of the "Cistertian order of Monks," towards raising the amount. Pertinent to the foregoing, James, from whom I quote, gives a balance sheet of the exports and imports of the kingdom in 1354, (preserved in the Exchequer Records,) showing that the balance in favor of this country was to the amount of £255,204 3s. 6d.; the exports being £294,184 17s. 2d., and the imports £38,970 13s. 8d. In this amount there was no less than 31,651½ sacks of wool at £6 per sack, making a total of £189,909 for wool alone, and this exportation of raw material took place in the face of an enlarged home manufacture. In the reign of Henry VII., the woolen trade was greatly extended in this kingdom, and this

king, to use the quaint language of Defoe, "prohibited the exportation of unwrought wool, and to encourage foreign manufacturers to settle here, several of whom, coming over, established the manufacture of cloth in several parts of the kingdom, as (it is said) they found the people tractable: the bays in Colchester, in Essex, the Says, at Sudberry, in Suffolk; broadcloths, in Wiltshire; kerseys and narrow cloths, at Halifax and neighborhood in the West Riding of Yorkshire." It was in the reign of Henry VII. that a statute was passed to check the forestalling of wool. This was re-enacted in the reign of Henry VIII., and a clause run thus: "During ten years next ensuing, no person shall buy any wool before the 15th of August next after the shearing of the same, but such as would make cloth or yarn thereof, upon pain of forfeiting double the value; and no stranger should buy any wool before Candlemas day next after sheering thereof." Other enactments were also passed during this reign, which establish beyond doubt the high estimation in which wool, from sheep bred in the county of Norfolk, was held; nay, that worsted yarn could only be spun from such wool; and from other enactments we discover that large quantities were exported to France and Flanders for "the manufacture of Russell's worsted and other cloths;" so that "as a particular enactment goes, Norwich and other Norfolk towns were not only most likely to be brought to utter ruin and decay, but the inhabitants to be destitute of any way of getting an honest living."

No stronger evidence, I think, can be given of the value of this wool, and the estimation in which it was held abroad. It is curious to notice the laws passed in the reign of Henry the Eighth. One was to the intent that no person should hold above two farms, or keep 2,400 sheep, unless the land be inherited or held by a spiritual person. On account of the great profit which came from sheep, some persons kept 24,000, some 20,000, others from 5,000 to 10,000; whereby a good sheep, which used to be sold for 2s. and 4d., or at the most 3s., had risen to 6s., 5s. or 4s. (at the least); and a stone of wool, which, in some countries, used to be sold for 1s. 6d. or 1s. 8d., had risen to 4s. or 3s. 4d. at the least; and in others, where the price had been 2s. 4d., 2s. 8d. or 3s. at most, was then 5s., or 4s. 8d. at least. In the year 1338 the finest wool was about 5s. per stone over and above 40s. per sack duty on exportation. The price was undoubtedly set low by the royal wool stapler, as he was a purchaser without competition. McPherson (vol. 1, p. 521) says: "Edward III. had a grant from Parliment of 20,000 sacks of wool. He fixed the price, payable in two years, at which the best wool of the several counties should be settled for per sack, namely: Hereford, £9; Shropshire, £7; Lincoln, £6 13s. 4d.; Gloucester, Worcester, Chester and Flintshire, £6 6s. 8d.; Leicester, Stafford, Oxford, Som-

erset and York, (except Craven) £6; Northampton and Nottingham, £5 13s. 4d.; Warwick, £5 6s. 8d. All inferior wool as they could agree. These prices, settled by the king, were doubtless below the value of the wool. In the reign of Queen Elizabeth, Ginciardini, in his "Epitome of the Imports and Exports of Antwerp," writes: "And, from England, Antwerp receives vast quantities of fine and coarse draperies, fringes, and other things of that kind, of great value; also the finest wool." Smith, in his "Memoirs of Wool," (vol. 1, p. 102) shows that the annual export of woolen goods alone, at this period, from England to Antwerp, amounted to £750,000 sterling. In the reign of Henry the Second, the weavers who mixed Spanish wool with English were under the penalty of having the fabric produced burned. This clearly establishes the high quality of English wool; and although we must admit that the Spanish wool was likely to be improved by the introduction of English sheep into Spain, by permission of Edward the Third, still we find that wool from England was imported into Spain for the manufacture of the best cloth then produced; and, as we know, that Spain and England were then the only wool-growing countries in the world, it is a natural inference that England produced the finest quality. Hence, also, the importation into Flanders, which country then produced a higher quality of woolen fabric than any other.

I am now led to consider what kind of wool it is most likely we exported, and I have come to the conclusion it was our Norfolk long wool, as best fitted for making worsted. Again I refer to Mr. James, who quotes from Lord Herbert's life of Henry the Eighth: "That it was provided that no unwrought wool should be exported out of the kingdom." Yet the statute book at this period did not contain any prohibition against the exportation of unwrought wool, except that of Norfolk sheep. For ages extreme attention had been paid to the improvement of the fleece of this breed, upon which depended the staple trade of the district; and because of the fineness and length of the staple, and its particular adaption for making worsted, it had been much sought after by the continental weavers of worsted, and by various illegal means carried out of the country. Now, however, the export had become so extensive to supply the foreign makers of says, Russels, worsted, &c., as to threaten the extinction of the home manufacture; and a law was passed in the sixth year of Henry the Eighth, which tended greatly to revive and encourage the drooping domestic manufacture, whereby it was declared "That none should carry beyond the sea any Norfolk wool meet for making worsted stammins, upon forfeiture of 40s. for every stone of wool so carried beyond the sea." In 1554, a statute concerning Russels' satins and satin reverses recites, "That for late years past there used to be manufactured beyond the sea (of Nor-

folk wool) and then imported into England, whereby the mysteries of worsted-making and weaving and the merchants and inhabitants of Norwich, which were formerly well maintained by the weaving and making of worsteds, were reduced very much, such worsted being brought out of estimation and of very little worth either in this realm or foreign countries, the said satins being worn in lieu thereof. To remedy this, the mayor and certain citizens and merchants (whose names are mentioned) have at their great costs in bringing over strangers, and in making looms for them to work with, produced of Norfolk wool, Russels' satins, and satin reverses, and fustians of Naples, to be hereafter called Norwich satins and Norwich fustians." Then follows, "That in consideration of these good services of the mayor and his colleagues, an act was passed creating a fellowship, granting powers to the wardens diligently to view and search and see all the Russels, &c., those truly and workmanlike wrought to be sealed with a seal of lead, whereby it might be known to buyers and merchants that the same are allowed to be truly made; such as were defective to be cut in two." James says at page 103, "What these peculiar fabrics, now for the first time made in Norwich, were, it is not easy to determine." The satins were perhaps, judging from their name, a glossy article, somewhat resembling bombazin, whose manufacture it seems to be settled the Dutch imported hither in the reign of Queen Elizabeth.

Naples was unquestionably noted at this period, 1554, for the luxury of the dress of its inhabitants, and the making of fine worsteds. Hence it may be inferred that these fustians of Naples, afterwards designated Norwich fustians, were of fine texture. I cannot define exactly what these particular fabrics were; but the bombazin and Norwich crapes were forty years ago both durable, and the Norwich crape elegant. The bombazin was in texture much like French merino to the eye, but not to the touch—to the touch it was rigid; but Norwich crape to the eye was perfection, and came as near to plain Irish poplin as anything I can conceive. In 1622 (James I.) a proclamation was issued, which declared that the exportation of wool and woolen yarn, &c., increased foreign manufactures, and brought about the decline and decrease in the sale of our home manufactures. This proclamation forbade exportation altogether, and is the first for total prohibition. Edward III., for his own royal convenience, only occasionally prohibited exportation; for it would appear that, conjointly with his ordinances, he granted licenses to export, to certain persons. In the reign of James I., wool fell from 33s. to 18s. per tod. This created such alarm that a special commission inquired into the cause: 1. Why wool had fallen in price? 2. How to prevent the export of wool and woolen yarn? 3. How cloths and stuffs made of our wool might be more

generally worn? McPherson (vol. 1, p. 481) writes, "That during the reign of Edward III., the exportation of wool had been prohibited, except by Royal license, which was very liberally made use of; but now (Charles II.) there was a general statutory prohibition in express terms. "This," he says, "was the first statute prohibiting the export of wool; but an exception was made in favor of the Channel Islands, whither it was allowed to export 3,300 tods of uncombed wools, each tod to contain 32 lbs. The stocking manufacture, which had now sprung up in these islands, was no doubt the reason of the indulgence. Sundry penalties were inflicted for the exportation of wool, but still very much found its way into France, where the worsted manufacture could not be sustained without, and every stratagem was used to obtain the wool of England. Long and soft in the staple, it was now, indeed, as necessary for the French manufacture (worsted) as it had formerly been for that of Flanders." The laws prohibiting the export of wool have never answered the end contemplated; for where there is demand and gain, the contraband trade will continue.

Fortery's pamphlet, "England's interest by trade asserted," printed in 1671, contains many interesting particulars respecting the contraband trade, carried on by the French in our combing wools, and the evils resulting therefrom. Take, for instance, the following passage: "Every pack of wool sent to France doth prevent us not only the benefit of the manufacture thereof, but of two packs more besides itself, viz; thus: it being combing and combed wool for the most part exported thither. The French, having no wools of their own, but such as are very coarse, are not able to make fine cloths or stuffs, there being none in all the world fit for that purpose but ours only, except in North Holland, and that a small quantity of fine wool, all others being likewise coarse, but Spanish wool, and that much too fine, especially for worsted stuffs, and not in any wise fit for combing, so that, without English or Irish wools, there can be no quantity of fine worsted stuffs nor a middle sort of cloth made in the world." The act of 10th and 11th William III., chap. 10th, recites "that wool, and woolen manufactures, cloth, serge, baize, kerseys, and other stuffs, made or mixed with wool, are the greatest and most profitable commodities of the kingdom. The value of land and the trade of the nation do chiefly depend thereon, and great quantities of the like manufactures have been of late made, and are daily increasing in the kingdom of Ireland and in the English plantations in America, and are exported thence into foreign markets heretofore supplied from England, and which will inevitably sink the value of lands, and tend to the ruin of the trade of the woolen manufactures of this realm."

Enactments were passed subjecting the vessels freighted with such goods

from such places to forfeiture, besides inflicting upon all persons aiding or abetting in the export a fine of $500. Do not overlook the fact that there was no prohibition to the export from Ireland and the American plantations to England; it was especially against the export from these countries to foreign States, establishing the fact that the government was jealously alive, as they thought, to the importance of supporting and protecting the wool growers and woolen manufactures. Dr. Davenant, a writer of the "Reports to the Commissioners of Accounts," says, "The annual income on which the whole population subsisted, and of which taxes of all kinds were paid, amounted to about £43,000,000, and the yearly rent of the land to £10,000,000." Mr. James thus expresses himself: "What a grand, what an astonishing impression this conveys of the wealth accruing from the handicraft employed in wool-producing merchandise, nearly equal to one-fifth of the whole annual income of the realm, and almost approaching to the value of the land." Gregory King, at this period, valued the whole of the wool shorn in England at £6,000,000, and with the value of the materials at £8,000,000. This estimate is vouched by Dr. Davenant. A manufacturer of Northamptonshire, in 1739, in the reign of George II., says, "The wools of Warwickshire, Northamptonshire, Lincolnshire and Rutlandshire, part of Hunks, Beds, Bucks, Cambridgeshire and Romney Marshes, with some parts of Norfolk, have been accounted the longest and finest combing wool. But of late (by the improvement in the breed of sheep and different kind of feeding) there is some large fine combing wool to be found in most of the counties in England." He then speaks of the wool of certain districts in Ireland—Tipperary, Limerick, Kilkenny, Kerry, Waterford, Connaught and Cork—as no way inferior to the long wool of England, except a small quantity of wool that grew in some parts of Leicester and the south marshes of Lincolnshire, which was longer than any wool grown in any part of England besides, and was of a beautiful shining color, although long, yet very fine and soft, and bearing an exceeding good gloss, superior to that of any of the wool of Ireland.

In the year 1749 the woolen trade was prosperous, and artizans in this manufacture were fully employed. I find from a table of the average price of Lincolnshire wool from 1700 to 1749, that the highest price was 28s. in 1717 per tod of 28 lbs., and the lowest 13s. In 1749 the price was 19s., 6d. At this period a great change was taking place in the quality of wool grown in England. Long-wooled sheep were more general throughout the kingdom. They were to be found in Lincolnshire, Leicestershire, Devonshire, Durham, Yorkshire, Cambridgeshire, Notts, Warwickshire and other counties.

Except in the marsh lands long wool has ceased to be a peculiar growth of Norfolk, which now, by a strange metamorphosis, supplies excellent materials for cloth.

I think I have shown clearly that wool has ever been a most important article of commerce, both in its raw state and when manufactured. Nay, I may say the fact is established that wool may be considered the only national staple we possess. Italy has its staple—silk; Portugal and Spain, wine (the vine), as also France and the Rhenish provinces; whilst to Spain we may point at an early period of our history as a country competing with us in wool and also woolen manufactures.

In the slight historical sketch I have given, you will recollect I pointed out to you that Spain had greatly benefitted by the introduction of our breed of sheep, in the reign of Edwards Third and Fourth. These facts being established, the importance to agriculturists of the question, how we can supply a rising demand for a particular kind of wool—"the lustre wool"—is apparent. To the agriculturists I dare not offer a word of advice touching the encouragement to be given to this or that breed of sheep. I can only convey to them, as a worsted spinner and manufacturer, a knowledge of the want of this particular kind of wool at the present day. To them I also point out the fact, that our woolen trade has greatly increased, and would still more largely increase had we sufficient of the raw material. To establish this, I draw attention to a circular issued by the Chamber of Commerce of Bradford and the woolen districts, on March 25th, 1859. It commences thus: "The very high price of combing wool has led to the consideration, whether it is not possible to encourage its growth, the high price being attributable to the consumption of this kind of wool gaining upon its growth." It further states that the Chamber of Commerce is of opinion that no large additional supply can be expected from the home growers (this I hope our home growers will prove is an erroneous opinion); points out from whence supplies might be obtained, and invites the organization of societies, to disseminate amongst the inhabitants of such countries the information on management already at command. In the appendix to this circular is the following declaration:—"This Chamber is conscious that the peculiar excellences of our long-wools are dependent upon our temperate and humid climate and succulent grasses."

In February, 1861, another circular was issued, entitled "Address of the Wool-Supply Association of the Bradford and Halifax Chamber of Commerce, to all Parties interested in the Growth of Colonial and other Foreign Wools." In this document they again speak of an adequate supply of long-wool. The wool required should, they say, have a staple from four

to seven inches in length, of uniform quality throughout its whole length, and bright and lustrous in appearance. In addressing foreign growers, they point to the fact—not to be overlooked in this account—that "the flocks" should be pastured as much as possible upon succulent grasses, similar to those grown in Great Britain, the object being to get a bright lustrous wool. Your attention having been drawn to the demand for this particular kind of wool, the home supply of which, you have been informed, is outgrown by the demand for home consumption, besides our having customers from France and Germany, the question arises:—"Does this demand for a national staple assume a character and dimensions sufficiently interesting to farmers to justify them in considering whether wool may not be a product more and more worthy of attention as the means to the end of rendering their operations more profitable?

I have been much impressed by some remarks made by Mr. Cobden, upon the occasion of a trial of steam plows, which recently took place in the Lothians. "What is it," he says, "that constitutes the prosperity of agriculture, or any other pursuit? It is to have a flourishing and increasing number of customers." And he pointed to the fact that your largest consumers are the manufacturing, mining and industrial population of this country. Further, he remarks, addressing as he was a large and influential number of agriculturists, "I need not tell you, who are so far advanced in the science of agriculture, that that which lies at the very foundation of all scientific agriculture, is the large and constantly increasing production of the manure-producing animals—the cattle and sheep which you rear on your land; hence it becomes a question whether, with the present increased consumption of wool in England, and also the increased consumption of mutton and beef in some districts (and I emphasize *some districts*), it would not be more profitable to the farmers to turn their attention more to the growth of wool, mutton and beef, which, under certain conditions of soil, &c., might be more profitable than wheat, particularly as the foreign markets for wheat are extensively open to us. And may I not here remark that wheat, possessing a character (by a merciful dispensation of Providence) adapting it for cultivation in all climes where civilized man becomes resident, and can therefore be almost universally grown, is as a product of land contrasted with wool, less under the influence of climate, and therefore open to more general growth. I think we have no fear of any want of cereal produce, but unless the English agriculturist bestirs himself, we may justly apprehend the scarcity of long-wools; and as they have not yet been grown in any other country to the same perfection, arising, as we have evidence, partly from the pasturage, partly from the breed, and also (generally) from the care taken of long-wools. I do think the agriculturist will

not think me intrusive in urging the consideration of this question upon him."

An intelligent farmer, resident in Yorkshire, kindly furnished me with the following:—"The lustrous condition of wool depends much on cleanliness, and here attention is required from the shepherd. Such attention would be highly remunerative." Another writes: "This wool—the lustre—is grown both from Lincolns and Leicesters, and also a cross between the two from Hoggets,* and a great deal depends upon the cleanness of the sheep and the land they are grazed and fed upon, more than upon the breed of long-wooled sheep. When it is bright-haired and glossy, we can always sell it for more money. The best class of Hog's wool, about Ripon, generally commands the best price in this district, but it is chiefly owing to the land they feed upon." This statement is confirmed by many others. Leicester rams have been sent out to India, China, &c., but from my own knowledge the wool deteriorates in length after the first cross, and can only be kept up in anything like length by great care and attention. A gentleman from Leicestershire, whose operations are devoted exclusively to sheep, has given me some interesting particulars upon the subject. Being totally unacquainted with the causes which lead to the demand for the particular kind of wool now in great request, he spoke of the increased value of wool generally, and said that his profits were incident alone, and dependent entirely upon the production of mutton and wool. Beef was a simple addendum, not particularly note-worthy in a mercantile point of view, inasmuch as on his farm the fleece alone paid his rent. Taxing him with his estimate of profits, I asked him whether there was not an indirect element overlooked? and he ultimately admitted that apart from the mutton and wool, there was an indirect profit incident to the fact that the manure-producing animal gave back to the soil as much, if not more, than was taken from it. I think the landlords will notice this assertion. This statement, to my mind, as a mere man of commerce, appeared anomalous, but he fortified his declaration by saying that a soil but slightly prolific, became abundantly fertile through the droppings of sheep: in other words, that which gave but poor pasturage to the sheep this year, became, when disintegrated in the stomach of the sheep, a source of civilization, which made the pasturage of the next year infinitely more abundant. He gave me other facts well worthy of notice. These were, that a Leicester flock taken by him to Ireland, degenerated rapidly; and in answer to the inquiry, whether this might not be attributed to crosses, he assured me that both the ewes and tups of this degenerated flock were pure Leicesters. Emphatically he said their wool became no longer the covering as it were

* A hog—a hoggett—a haggerill, is a name given to sheep after weaning until shorn.—KLIPPART.

of sheep, but like that of the goat, (I use his own language) not forgetting the physiological fact that the goat's covering is hair, whilst that of the sheep is wool. All this shows that climate and soil are the causes which enable the agriculturist of England to grow lustre wool.

The large quantity of wool which is imported from India, is a very useful wool for blanket and carpet manufacture, but it does not compete with our long English wools. The same may be said of our Australian colonies, the whole coming from there being adapted for clothing, except the longer staples, which compete with our Down wools and German wools. There are hopes that at some time we may get from New Zealand a long staple wool; but, at present, the wool of that colony lacks the lustre, which is a distinguishing feature of our long wools. To show the character of the present competition our long wools have to sustain, I have collected a few samples of the wools, produced in the countries from whence we obtain our largest supplies, and also samples of our long wools. These will show, even to the uninitiated, the difference between the wools of the several countries represented, and the really small competition our long wools have to fear. From Canada we have received a small supply, at uncertain intervals, of a wool very much resembling our Leicester wool; but this wool is very much depreciated in value, from the want of cleared enclosures for the sheep to graze in. This want causes the wool to have a good deal of burr or seed, gathered by the wanderers, which burr or seed is very troublesome to the manufacturers; and it will be a long time before Canada will be able to supply us with such wool. I am, moreover, of opinion that Canada can never compete with our long wools, the climate differing so greatly from our own, which is manifestly well adapted for its production. The wool or hair which shows the most brilliant lustre is the mohair, the produce of the Angora goat. I find that the imports of this most desirable wool have not increased much; but that the price this year, notwithstanding the disorganization, to some extent, of trade, in consequence of the American war, is higher than it was before, showing the increased demand for lustre wools, and the appreciation the products manufactured from lustre wools are held in by our customers throughout the world. I find, further, that English lustre wool, during the seven years inclusive of July 1st, 1849, to July 1st, 1855, averaged 12½d. per pound, showing the regularly increasing value of this wool, and therefore proving the desirability of increasing its growth. The present price of Leicester and Lincoln, and indeed all the home-grown lustre wools is about 1s. 10d. per pound. Not being practically acquainted with the best means of increasing the growth I shall not presume to offer any advice on the subject, but shall be well satisfied if I have awakened an interest on this important subject in the mind of the grower of wool. Of course the chief ques-

tions for the farmer to consider are, first, Will it pay me better to grow lustre wool than what I am now growing? Is my farm adapted for feeding the breed of sheep which grow this wool? And, lastly, Am I likely to have a continued demand from the manufacturers for this wool? To the last question I fearlessly answer, that you are likely to have a continuously increasing demand for this wool, and you have less competition to fear from other countries in supplying this sort of wool than you have to fear with respect to any other description, so that there is a better prospect of obtaining a high price. I exhibit small samples of Lincoln, Leicester and Northumberland wool, all more or less lustre wools. I also show samples from various countries, some of which show a little lustre, but lack that soft, silky appearance which belong to our long grown wools. In the China wool we find some lustre, but it is short and kempy. In the Egyptian wool we find a nice lustre, but, from the climate and breed of sheep it is of a harsh description. In some of the wool grown in Turkey we find lustre, but, from climate, feed and want of care, it is very scurfy and tender in the staple. From South America we get the alpaca wool; this, with the mohair, being the only wool imported which combines all the required qualifications of lustre wool. Thus, I think, in conclusion, I have shown that the price of lustre wool is very high, the fleece is known to be heavy, and the fear of competition is very small. These three elements combined may, I hope, induce gentlemen here present to act as if they felt "the desirability of increasing the growth of lustre wool." Mr. W. Fisher Hobbs (Boxted lodge, Colchester,) said there was a very wholesome rule of the club, that one-third of the members might be non-agricultural. Their experience that evening proved that the rule was a good one. A gentleman had come before them to state the views of manufacturers and wool-staplers; he was in no way connected with agriculture, and he had brought forward the subject in a national point of view, and he had the good fortune of meeting his friend, Mr. Anderson, occasionally, as a member of that club for some time past; and with his friend, Mr. Bell, who, he was sorry to say, was not present that evening, and other manufacturers of the north of England, they had had frequent discussions on this subject. Although the question of the growth of the luster wool had been mooted elsewhere, he had nevertheless thought it desirable that it should be discussed this year in the club. When he asked Mr. Anderson to introduce the subject, he readily consented to do so, and they would all be sensible how ably he had handled it. They had now heard what were the views of the manufacturers, and, as practical men, they must now see how far they could carry them out. In April, 1861, he met Mr. Caird in the rooms of the Royal Agricultural Society. On that occasion

Mr. Caird observed, speaking on behalf of the manufacturers of this country, now that the importations of short wools were so large, there was no necessity for the English producers to grow short wools, and they should in fact grow lustre wools. Now he (Mr. Hobbs) thought as practical men, who, in various parts of England, paid much attention to the breeding of sheep, they would agree with him that, however desirous they might be to aid the manufacturers, and also to assist their own breeches-pocket, by producing a larger fleece, in the larger portion of this country, it was utterly impossible to produce at a profit wool with a lustrous character. If they looked at nature, they found that throughout all the southern counties of England the sheep had a short, close texture of wool, to protect it from the atmosphere and from the influence of the various seasons peculiar to the district where it resided. Looking at the Southdowns, they found on the chalky soils a peculiar feature in the wool; and if the sheep were removed to the midland districts, or to Cambridgeshire, where Mr. Jonas Webb produced sheep in such perfection as regarded the carcass, they found that the character of this wool, instead of being improved, was ordinarily injured. On the gravels of Cambridgeshire, by means of high feeding, the length of the Southdown wool had been increased; but he hesitated not to say that the quality was not maintained. He did not deny that soil and feeding exercised considerable influence; but nevertheless he maintained that climate would control the character of the fleece given by nature to protect the sheep against the elements. Man could, he knew, do much; but with all his efforts he could not overcome the works of nature, which, by a beautiful arrangement, clothed the animal, and at the same time produced food for the sustenance of man. Now he wished particularly to go into some points involved in this question. He had himself lived in one of the midland counties, and had watched very closely the growth of wool, as well as the form of the animal and the quality of the mutton; and he hesitated not to say that in his humble opinion, wool of a lustrous character could not be produced generally, even in the midland parts of England, without a great deterioration of the carcass, and upon an animal of a different kind from those required in the present day to secure a good quality of mutton with early maturity. He contended that the sheep which produced lustrous wool was an animal that was peculiarly adapted to the lowlands of Linconshire. On that point he would presently read to them the opinion of a very able writer, about fifty years ago, who was also a very excellent breeder of stock. The Lincoln sheep, which then produced this lustrous wool was, he believed, a sheep of narrow form, flat sides, very large bones and thick skin; an animal which required a longer period to fit it for the butcher than the sheep which had a

correct form, good fore-quarters, a broad back, and a good quality of skin, at the same time that it produced a good quality of wool. The same principle might still be observed and carried out in cattle and swine, and also in the horse. In the pig, a coarse, thick skin invariably covered a coarse fibrous flesh. So, also, with regard to the Lincoln sheep, that was especially adapted to produce lustrous wool; that, he contended, was not the kind of sheep which was required in the present day. Those who bred such sheep produced at the sacrifice of mutton. It required a larger amount of mutton to produce a pound of wool, than would be required if they were not producing this lustrous wool. Mr. Robert Smith, who was present, knew the Lincoln sheep better than he (Mr. Hobbs) knew them; but there were other gentlemen present, who lived in Linconshire, and though Lincoln flocks had been improved of late years, he believed that to produce a pound of lustre wool in the spring of the year would require four pounds of mutton. He thought that Mr. Smith would agree with him that a hogget of Leicester form, with early maturity, was ready for the butcher in the month of May; whereas a sheep producing this lustre wool, would not be ready for the butcher till the month of July. In that case there would be eight weeks additional keep to supply. He believed the Lincoln graziers fed their sheep with from one pound to four pounds of cake per day. At all events it might be assumed that there was an outlay of 9d. per week, and they might set down the rest at 3d. (A voice, "six pence.") Well, he would say 6d., making 1s. 3d., which, in eight weeks, would amount to 10s. Now, in those two months, how many pounds of wool did the lustrous old-fashioned Lincoln sheep produce? It certainly did not produce more than four pounds of wool; nor did he believe it would produce so much. He contended that a sheep possessing the Leicester character would come to maturity better, and fetch a better piece of mutton in the month of May, than the old Lincoln, with lustre fleece, would in the month of July, and that they were losing 4s. in mutton for the sake of gaining an extra quantity of wool. But, independently of that, let them look at the loss sustained in the quality of mutton by having a lustrous fleece. When he first acted as a judge at an agricultural meeting, being then very young, he happened to act with an old judge, whose words he well remembered. It was in the county of Bedford and they had before them a pen of old lustrous Lincoln sheep. His friends requested him to put his hand on the back of one of these Lincoln sheep, and said to him, "If you made a hole there, and put a quill in it, you might suck it as you would an orange." When they got these Lincoln, with their illustrous fleeces, they usually had an inferior quality of mutton.

Bell's Weekly Messenger of that day told them that the difference between the price of Lincoln sheep and that of Southdown was 1d. per pound; and although the farmers of England were very desirous of assisting the manufacturers as far as they could, and if possible, of obtaining a better return for their wool, they must take care not to sacrifice the quantity and quality of mutton in endeavoring to increase the production of wool. He thought he was not saying too much with regard to the quality of the mutton of Lincoln sheep. His old friend on his left (Mr. Skelton) gave him just now a very humerous description of the quality of the mutton of the Lincoln sheep. He said it was some of the best mutton in the world; that if killed at Christmas, and hung up for twelve weeks, and then interlarded with five score of oysters, it would be found wonderfully good stuff. In relation to quality, he would now read what was said by an able writer fifty years ago. At that period Mr. George Culley said: "The rich fatting marshes in Lincolnshire are, beyond any other county I know of in the island, best adapted to the growing and forcing of long heavy wool. This, with the high price that kind of wool had given, previous to the American war, very probably induced the sheep breeders of that county to pursue it so ardently in preference to every other requisite, that they neglected the form of the carcass and inclination to make readily fat *essentials*, that the other sheep breeding counties were under a necessity of attending to, otherwise they could not have got them made fat in proper time, from their land not being in general near so rich as the Lincolnshire marshes. In short, the Lincolnshire breeders, by running so much upon wool and large bones, had got their sheep like their black horses—two great ends, a long thin weak middle; and lost the thick, firm barrel-like carcass, broad flat back, fine clean small bone, and inclination to make fat." There was also the following note in reference to the writer's travels: "On asking a butcher's wife, at Bury, in Suffolk, how she sold mutton? *Five pence a pound, sir!* answered she, smartly. And pray, replied I, (rather surprised at the high price,) have you no mutton below five pence? Oh yes sir! rejoins the honest woman, *plenty of Lincolnshire at four pence; but we do not account it mutton when compared with our Norfolk or Suffolk mutton.*"

That was in former days. Their friend Mr. Skelton would, no doubt, tell them that since that period there had been a great improvement in the Lincoln sheep; an improvement which was affected by crossing with the Leicester. It might be objected that the book from which he had just quoted was an old one. He would refer to a prize essay, written a few years ago for the Journal of the Royal Agricultural Society, by a gentleman that was well known to all present, (Mr. Robert Smith), an essay

which was highly appreciated at the time by agriculturists throughout the country. Mr. Smith there said: The Long-wools are principally classed under the head of Lincolns, New Oxfords, Cotswolds, Teeswaters, and Kents. The long-wooled Lincolns were formerly the chief or only variety produced in the county; they seemed formed for the then rich marshy soils or cold situations, (there being little or no heath land under cultivation,) and their principal property was their long, strong wool to protect them against the vicissitudes of the eastern winds, upon their bleak open pastures during the winter months. They were further known by their large white heads and ears, long thin carcass, with exceedingly large bones; and from their wool bearing propensity, they were scarcely ever fattened previously to the third year.

In consequence of the rapid advances of our manufactures in the production of finer woolens, and the altered tastes of the people, this breed of animals has happily gone nearly out of fashion; some few are yet to be found in the neighborhood of Louth, Caistor, and Boston, and are sought after by some breeders, who sell their lamb-hogs in the spring to the marsh graziers, to be by them fattened if possible.

Now, there had been a good deal of discussion on this subject privately in the club. One day he asked Mr. Bell, who was one of the oldest members of the wool trade, as well as a member of the club, whether if he were to show him a map of England he could not trace out with a pencil the districts where lustrous wool could be grown to the greatest advantage? The reply was in the affirmative, and that in no other parts of England could such wool be produced profitably. He (Mr. Hobbs) bred Leicester sheep for many years in the county of Essex, and he did all he could to maintain the natural character of the wool. The lustrous character of the fleece gradually disappeared, and he at length became convinced that it was useless to contend against the course of nature. He trusted that the farmers of England would pay due attention to this point. They might be very willing to listen to any suggestions with regard to the increased production of wool, but to ask them to sacrifice the mutton was a very different matter. He was very glad that he had requested Mr. Anderson to introduce this subject; but he thought it would be found that neither the Lincolns, Leicesters, nor the Cotswolds, however they might be treated, would enable farmers generally, with the peculiarities of climate and situation, to supersede the short wools of the south of England.

Mr. Ward, (Drayton, Rockingham,) said, as farmers they must all feel indebted to Mr. Anderson for having come forward to point out to them the kind of wool which in his opinion might be grown advantageously; but the difficulty with which they had to deal with was in obtaining a proper soil for growing lustre wool.

It seemed very extraordinary, but it was a fact, that long-wool might be produced from a district extending for seventy miles, and that after that it unavoidably became short. He could not quite agree with Mr. Hobbs in what he said about the Lincoln sheep. The Leicester and Lincoln sheep were almost the only sheep that could produce the kind of wool that Mr. Anderson thought they ought all to endeavor to produce. They were told by Mr. Hobbs that these sheep were all of a very bad quality.

Mr. Hobbs said he spoke of the old Lincolns, not of the improved ones.

Mr. Ward continued: For his own part he must say that being in the habit of going into Lincolnshire in the spring, he found better sheep at the Lincoln fairs than anywhere else. Within the last three or four years he had seen three or four hundred tegs pitched in a pen and sold at three guineas apiece. Lincoln sheep could not, therefore, be so bad as Mr. Hobbs seemed to suppose. Many tegs in Lincolnshire weighed 14 stones, and some as much as 17 stones in April, when they were a year old. From the paper which had been read they learned that the wool which fetched the highest price was goats' wool. According to that they ought to keep goats instead of sheep.

The Chairman: What breed of sheep do you patronize?

Mr. Ward replied that he had no particular breed; his sheep were Leicesters, and he touched them up slightly with the best Lincolns.

Mr. Unwin (Colchester) observed that there was no branch of trade or manufactures in this country which had commanded in past times so much attention as the worsted and woolen trade.

The growth and cultivation of wool also had occupied the leisure of the affluent, and the skill and sagacity of the agriculturist from time immemorial. Notwithstanding the fiscal reforms which had of late years been carried out, thereby securing free ingress into this country for the produce of every part of the world, the British farmer enjoys at the present moment what amounted to a monopoly of the growth of long wool. This is simply owing to the fact that no other country possess such skillful agriculturists, and no other climate or soil in the world has been found so suitable for producing long-wool in perfection as Great Britain. There was now no royal woolstapler, as in the reign of some of our earlier monarchs, to dictate the price at which wool should be sold. There was therefore a wider scope for the extension of the growth of wool and the breeding of sheep than there was in any other department of agricultural enterprise and production; and he thought it both the interest and duty of the British farmer to increase the production of these articles to the largest possible extent. The augmented value of lustrous wool was owing to the introduction of an entirely new branch of manufactures; he referred to the manu-

facture of alapaca. Mr. Salt, the owner of Saltaire, was the first purchaser of alapaca in this country, and the first to convert it into beautiful fabrics. The extensive use of alapaca gradually led to an increased demand for Lincoln wool, for the purpose of mixing with alapaca, and the manufacturing of fabrics of a lustrous appearance. The result of this great demand for Lincoln wool has been to change the relative positions which fine and coarse long wool formerly occupied, and enhance the price of heavy Lincoln wool far above the fine Southdown, so that at the present moment Southdown wool is selling: Bradford at 1s. 8d., and Lincoln fleece is selling at 1s. 11d.

Fashion was, as they all knew, very capricious and uncertain, and it would be very unwise in farmers to change their system altogether because a particular kind of manufactured article happened to be for the time most in favor. He would advise them to use their own judgment and discrimination in the matter, and select that class of sheep which was most adapted to their diversified localities, and which would produce the most mutton and the best wool. Having had thirty-five years' experience in the wool-trade, he had never known Down ewe fleeces fetching a higher price than they did at this moment, evidencing that all classes of wool participated in the present brisk demand. Such was the extension of the demand for worsted and woolen manufactures that there seemed to be no limit to the consumption of sheep's wool, while obtainable at a fair price.

Last year, whilst the home growth was estimated at 157,000,000 lbs., the importations amounted to 147,000,000 lbs. The estimate of the amount of wool produced in Great Britain, was based on a supposed average yield of 4½ lbs. per fleece from 35,000,000 sheep. He thought the average was not less than 5 lbs., and if that were the case, there would be produced annually in this country 175,000,000, of the value of £10,000,000 to £12,000,000 sterling. It was almost impossible to magnify or exaggerate the national importance of this branch of our industrial enterprise. It was equally important to the interest and success of the grazier and breeder of sheep to endeavor to ascertain what description of sheep was most adapted to produce in the locality in which he might be situate, the most delicate flesh, combined with the greatest weight of carcass and fleece. Those were the points to which they should direct their attention. No doubt the county of Lincoln was best adapted for the growth of heavy lustrous wool, in consequence of its rich pastures and greasy soil. The Lincoln sheep had a preference for a soil of that nature, and it suited and stimulated the growth of wool, and assisted to impart to it its gloss or lustre. There were, perhaps, other parts of the kingdom where Lincoln sheep might flourish, but it was limited in extent. They might, perhaps, be kept to advantage in the lower

lands of Essex, or Romney marshes in Kent, but it is a question whether the Kentish grazier would be benefitted by substituting the Lincoln breed for his own native one, the Kent. He would say to the Lincolnshire gentlemen, so long as they can obtain from £3 to £4 for the carcass and one guinea for the fleece, stick to the Lincoln sheep. He would say to the Sussex, Wiltshire, and part of Norfolk and Suffolk graziers and breeders, Till you can find a class of sheep more suitable to your close herbage and dry soils than the close-coated, brown-face sheep, and one that would be more profitable, adhere to your Southdowns.

Mr. Hobbs has referred to his own experience in the matter. He had, at the period mentioned, one of the finest parks in the county of Essex for the growth of Down wool. Mr. Hobbs introduced the Leicester breed, and in spite of his superior management and acknowledged skill and judgment as a grazier, they soon began to degenerate, and every year they became worse. Both sheep and wool lost in weight and quality, because the grasses were not sufficiently rich to sustain the growth of wool, and permanently to produce long-wool sheep and wool. This would be the case wherever the experiment might be tried, if the animals were not kept fully up to the mark by rich pasturage, or very high feeding on heavy soils.

Mr. R. Smith (Emmet's Grange, South Molten) said the description quoted by Mr. Hobbs from his prize essay, written fifteen or sixteen years ago, was applied to an animal which was fast going out of repute, and out of use, the old Lincoln sheep. These sheep had, like other animals, lost their roughness with the improved and improving character of the age. He would just read to them another part of his essay, which applied to the subject under discussion: He first spoke of the different breeds of sheep in England, their capabilities, their uses, and the effects of climate. He said that if any one were to take a map of this island, and begin in the north, he would soon find a cold region, and sheep adapted to the peculiarities of the climate; that in the midland counties he would find another kind of sheep; and that on the chalky soils, where southern winds and sun prevailed, there was again another variety, the whole product being thus dependent on soil and climate. The mountain range, where he now resided, was found to be suitable for a particular breed of sheep. They knew, he might remark, by observation, that if a farmer removed from east to west, or west to east, in nine cases out of ten there was failure. The dry husbandry of youth practiced in the east did not answer in the west, and *vice versa*. The Scotchman who came south from a much moister climate, did not succeed for that reason, and therefore not unfrequently went back again. These were practical truths, and they must not be overlooked. Now, in relation to this subject, he wrote at page 25 of the *Journal* for 1847:—

From close observation I have found the quality and quantity of wool to be governed by the quality or description of flesh upon the animal; hence certain wool and certain mutton go together. Further, so often as the wool is observed to change upon the back, or otherwise, of the sheep, so does the quality of flesh change, commencing at the exact division of the varieties of wool, thus showing the importance of selecting those animals that possess the best description of wool and mutton. Now these carry but one sort of wool upon their frames, and that of a mellow, moderately long, thick, bunchy character, under which is found the mellow flesh peculiar to first-rate animals, which flesh is found to spread or expand itself more rapidly than any other, but with a sufficient degree of firmness. Under short, fine wool is found extra firm or hard flesh, which does not expand or grow in proportion. With thin-set, strong wool, we find the animal to have a white, objectionable head, with loose or coarse-grained flesh, wanting in quality in due proportion to the wool it bears, and the animal is never, in consequence, known to spread wide, but represents its degree of fatness along the back. As a confirmation of this, he might name that the "wool stapler" found ten sorts of wool upon a single fleece. They would find that long wooled sheep varied in their fleeces, and that as their fleeces varied, so also did the flesh underneath. The influence of warmth was a law of nature. Warmth produced the fine wools, cold, the coarse wools. He was much obliged to Mr. Anderson for having introduced this subject. Having been a breeder of sheep from his youth, he had never deviated from that branch of agriculture. They might depend upon it that if mutton and wool would not pay the farmers' rent, nothing would.

Mr. Anderson had very properly alluded to the use of sheep in treading or manuring purposes. The fact was that the sheep was in that respect the main vehicle of improvement, and he believed that animal returned more money for what it received than any other. As regarded, lustre wool, it was quite true that it could only be grown on certain animals, or rather, on certain soils. It had been observed that the sheep which produced such wools liked to be on greasy pastures. Now, what were greasy pastures? They were fat pastures. He would go further, and ask with regard to artificials, whether it were not possible to supply another element which would produce lustre? Perhaps the nearest approach to the material element was oil-cake. They all knew that when wool became greasy, it acquired a certain amount of curl and lustre, which was peculiar to high feeding He believed they might very much increase the tendency to lustre by giving the animals corn. He would suppose that having given some Lincoln sheep corn, he afterwards sold them at a fair. He had then done with them, and it did not matter to him who had them the next morning.

But he would now suppose that they fell into the hands of a man who let them remain in grass without oil-cake or corn. What happened? The wool-stapler said: "This is capital wool, but there is a little check which I don't understand—the wool is jointy, poverty-stricken, at a certain place." If he had fed them with oil-cake or beans the result would have been different, and the wool would have realized the highest price. Here, then, was the practical question which appeared to him deserving of consideration. It appears in practice that lustre wool is peculiar to a certain district, arising from soil, climate and management. If so, what is the nearest representative? High feeding of that class of animals when introduced in other parts.

Mr. Dring (Claxby, Spilsby), considered the subject which had been brought forward well worthy of attention. If they could grow 12 lbs. of lustre wool and make 50s. a tod, that was one of the best things they could do as farmers. As regarded the increased growth of lustre wool, he believed the increase could not be carried to the extent that some persons seemed to imagine. If they attempted to grow such wool on barren soils, or in climates which were not specially adapted for it, they would find that it did not pay. In any county like Lincoln, where there was a soil that would feed five or six sheep or bullocks to the acre, the farmers might grow lustre wool; but in districts where the soil was weak and thirsty, unless artificials were used, it was very questionable that this kind of production would yield a proper return. In going over different counties in the south, he had often thought how ignorant the farmers must be to do so and so; but when he came to sift the matter, he found that there was a reason why. If a person began to deviate much from the system prevalent in the county where he resided, he would generally find that he was mistaken. In some counties long-wool sheep were very valuable, he now referred, especially in districts in which there were heavy soils.

Two or three years ago a friend of his took a farm in the neighborhood of Newmarket, where the sheep were principally short-wooled sheep, and as the farm was a deep heavy soil, where good turnips and seeds could be grown, he recommended the long-wool sheep, which has answered exceedingly well; and the last twelve months he has had many applications for his long-wool ram, lambs and ewes, by his neighbors. He had not the slightest doubt that wherever the soil was heavy, long wool might be grown to some extent, but they should beware of going too far. The price of wool was now very high, and it had been so for some time; but if they all aimed at producing the utmost, they would perhaps make a mistake. It was all very well to produce pretty liberally, especially as the sheep was such a great improver of the soil; but he could remember a time

when the price of wool was something like 60s. a tod. This case was something like that of corn. When it was at 80s. a quarter they were all for growing it, and the result was that they were afterwards glad to sell it for whatever they could get; there, as in other cases, truth, safety, and profit lay between the two extremes. The CHAIRMAN said before the subject was brought to a close he wished to make one or two observations. They were all highly indebted to Mr. Anderson for his pleasing paper, which had led to one of the most interesting discussions that had taken place in that room for some time past. The result of the discussion seemed to be this: that it was best for them as farmers to cultivate that breed of sheep for which their several localities were best suited. So far as he was personally concerned, if he were to make that club an advertising medium, as it had been made, he was sorry to say, on many occasions, he should tell them that there was a breed of sheep which he knew something about, and which was the best for all farmers to cultivate. During the remarks of their friend Mr. Hobbs, he was particularly anxious for the welfare of their friend Mr. Ward; he even feared that that gentleman might require a little restraint. However, Mr. Ward got out of his difficulty, as well as possible, without telling them that he was most interested in that breed of sheep which Mr. Hobbs had loudly decried. Mr. Hobbs advocated the short wools, Mr. Ward advocated the long wools; he (Mr. C. Howard) went between them. He knew a breed of sheep which yielded mutton of the finest quality and also provided first rate wool, and if they would come to him on some private occasion he would tell them all about it.

Mr. F. HOBBS wished to repeat, in reference to his remarks on Lincoln sheep, that he did not intend them to apply to the improved Lincoln sheep, but to the old Lincoln. He believed that nearly all the Lincoln flocks had been improved of late years by crossing with the Leicesters.

Mr. ANDERSON then replied. He said his proposition was simply that it was desirable to increase the growth of lustre wool. He had shown them that from time immemorial long wool had, in England, always had the pre-eminence. They now obtained ample supplies of short wool from their own colonies, from the Cape of Good Hope, Australia and New Zealand; but from no country in the world could we get long wools which would compete with those in England, unless it were the regions which produced alpaca, now worth 2s. 10d. per lb. Long wool had always been the staple wool of England, and he hoped it would maintain its superiority. Mr. Smith had made some excellent remarks with regard to the effect of soil and climate. The question which he raised, whether wool might not be improved by artificial means, was a very important one. He did not

presume to give any advice as to the manner in which they should conduct their operations; all he had done was to present facts for their consideration.

The term "lustre wool" is somewhat indefinite; but I believe it is given to that variety of long wool which possesses a rather long and bright hair—*bright or lustrous*. It is not requisite that the staple shall be very long, it need not exceed six inches in length, to come under the denomination of *lustre wool;* but the longer the hair, provided it is bright, the more valuable it is in its character. In Lincolnshire, at the present time, the hogget wool of the coarser, not to say coarsest kind, is of the greatest value. The hogget fleece shown on the long-wooled hogget, at Battersea, by Mr. John Clarke, was one of the highest value; the length of hair averaged about 17 inches; the weight supposed to be 20 lbs. Such a fleece, when used in manufacture to its utmost extent, as an admixture with cotton to fabricate the finest alpaca fabrics, would suffice to make upwards of 12 pieces, each 42 yards in length, and very possibly might be extended to 16 pieces or 672 yards. Nothing, therefore, can more strikingly denote or show its great value than this fact; and specimens of these said fabrics I have now before me as I write, and from reliable sources. Seeing, then, that this wool is so valuable in manufacture, let us inquire from whence it is derived, and how its growth can be more generally extended throughout the country. The best lustre wool is produced by the Lincolnshire long-wooled sheep. The next, in point of merit as lustre wool, is derived from the Leicester and the Cotswold breeds of sheep. The Kents and Romney Marsh come next; and I believe, but am not quite certain, that the large old Irish might be taken next, they having been greatly improved by crossing with Leicesters, Cotswolds and long-wooled sheep. I am not aware we have any other breeds that can lay claim to produce lustre wool. The highest fed Cheviot fleeces approach it; the old Ryelands and Teeswater can scarcely be found. Of these breeds the Lincolnshire long-wools stand prominently foremost as producers of this most valuable wool, having by far the pre-eminence both in weight and quality. The specimens shown by Mr. John Clarke, (named above) at Battersea, were of extraordinary length. The staple from a long-wooled ewe measured 40 inches in length, but it was of two years' growth; that from a ewe hogget was 24 inches long, and of but one year's growth. The staple of the three-shear sheep, shown also by him in the wool, was for the most part two inches broad, of great length and extraordinary weight. I mention these animals because they there were in the Royal Agricultural Society's show-yard, and were seen by thousands both of our own countrymen and foreigners. I could also instance the weight

of many clips of this wool, to show still further its great value. Take one of 1860, the number of hogget fleeces, 827; tods,* 129. In 1862, I have several reports before me: No. 1, 179 hogget fleeces, 72 tods; No. 2, 422 mixed fleeces, 191 tods; No. 3, 492 fleeces mixed, 179½ tods; No. 4, 760 fleeces mixed, 279½ tods; No. 5, 246 fleeces mixed, 95½ tods; No. 6, 190 hogget fleeces, 72¾ tods. These are what are termed "good clips," but by no means the best to be met with. The fleeces of these sheep would average, at present prices, about 20 shillings each. Now, I am persuaded that no breed of sheep can compete with them for weight and value of fleece. I shall, therefore, without saying one word in disparagement of the other breeds mentioned, proceed to show how the breed of this class of sheep, and consequently the growth of their kind of wool—*lustre wool*—may be greatly extended.

The Lincolnshire long wools, although partaking essentially of one general character, differ very considerably in minor points. They are chiefly bred and are to be found in the county of Lincoln and adjoining districts of other counties. In the northern part of the county more attention is paid to their uniformity and fattening propensities than to their wool. In the midland districts both wool and mutton are sought to be produced, obtaining about equal attention; and in the southern districts the three great requisites of large proportion with plenty of wool and mutton, are most prized and universally sought after. Besides these general differences, each breeder, or at least each breeder of rams on a somewhat large scale, has some peculiar taste or character displayed in his flock; and common or ordinary breeders congregate at these lettings, according to their respective tastes, or the peculiar demands of their respective holdings, for particular kinds of these said long-wools. The breeders upon the cold Lincolnshire wolds, and similar districts, look for a well-formed animal of moderate size, with plenty of mutton, and abundance of wool of fine quality and rather closely set. The occupiers of the midland districts seek after the like formation, but will venture upon a more open and somewhat heavier fleece; but the breeders of the southern districts of the county, and, indeed, all the rich districts of the fens and marshes of that and the neighboring counties, will seek after the largest rams which possess the heaviest fleeces and the longest and broadest staples of wool; in fact, they can scarcely be too large or too heavy in frame, neither in their mutton nor wool, to please a true South Lincolnshire breeder, and the breeders of similar districts, *i. e.*, those lying in Cambridgeshire, Norfolk, Huntingdonshire, and Northamptonshire, where this breed of sheep most abounds.

Now, if all this attention is necessary to secure suitable sheep, to suit

* A tod is 28 pounds.—Klippart.

each respective locality or district, or each respective holding in their native county, how much more imperatively necessary is it to adopt a similar and decided course in introducing them elsewhere? I have every confidence in this invaluable breed; and have no hesitation in saying that if proper precautions and requisite care are exercised in the selection of the peculiar variety of this, "*The Lincoln long-wooled breed" of sheep*, they may be profitably introduced into any district of three kingdoms where good natural pasturage abounds or can be found, and good turnips can be grown; and I am further of opinion that they may be introduced also where good clovers or seeds can be produced. It is perfectly futile and useless to attempt their introduction into any mountainous district, or even on high chalky downs. Their very size and weight deter them from traveling far in search of food; but they may be located on hilly districts of moderate elevation. The Cotswold hills and the Lincolnshire wolds are each probably more than 400 feet above sea-level, and both districts maintain breeds of sheep of great value and wonderful proportions. The richer valleys of those districts not immediately under the influence of mountainous exhalations or frequent changes of weather, would be found well adapted to their prosperity; but rainy or moist districts would be detrimental. This, in fact, is one of the main points of the whole subject, *i. e.*, the influence of climate on the fleece. I am well aware that Lincolnshire is one of the driest counties in the kingdom, and so far it is conducive to the favorable production of "lustre wool;" but this more particularly applies to that precise kind of it possessing the long open staple, not so much the finer and closer-set skins. It is patent to every breeder of these sheep that the open, thin-set "watery"-skinned sheep do not thrive well in a cold, wet, stormy and changeable season, even in their own localities. The closer-set skins beat them hollow; and for this reason: because neither cold, wet, nor wind can so easily penetrate to the skin itself, by reason of its denser coat or covering.

The casual observer has only to notice how readily the wool of the thin set skin is parted by a slight breeze, to be convinced that such is not the best covering to ward off the snows, the cold rains and storms of our fickle clime. This is no fiction. It is the plain fact; and, being so, I see no reason why, under proper selections, the Lincolnshire longwools should not be adapted, yes, and adapted to meet the requirements of every clime and every reasonably selected locality. The kind of sheep and the suitability of the district must be coincident with each other, and in accordance with the facts of the subject named, *i. e.*, the smaller variety and closer skins for fickle climes and inferior lands; the larger and heavier skins for medium soils and situations; and the largest and heaviest sorts both in

wool and mutton, for the best land and driest climates. I am well aware that the introduction of Lincolnshire longwools has been attempted in very many districts of this kingdom, and also in various districts in Ireland, but without uniform success, and in some cases it has been a total failure. It is said that both the west of England as well as Ireland are unsuitable, chiefly because of excess of moisture. The sheep cannot abide such continuous rains. It is also said that the south of England, and other warm districts, are unsuitable, owing to too much heat; that the wool speedily degenerates and becomes short and "mossy." In other districts, where the climate is not unsuitable, it is said the land is not good enough for them. It is also said they are bad breeders and bad sucklers; that the hoggets are tender and difficult to winter; that this class of sheep consume so much food; that they thrive slowly; that their mutton is of inferior quality. These and other like objections are raised. I will endeavor, briefly, to set aside many of these objections. First, climate. It is unquestionable that continuous rains do not agree with the satisfactory and safe progress of longwooled sheep—at least such as have an open staple. It requires the close set skin of a Southdown to withstand such wet. There is, however, a class of sheep, which is growing into favor with many Lincolnshire breeders, that approximate considerably towards the closer set skins of the Cotswold and Kents, not to say Downs: these I believe would thrive well in any wet, variable, or cold climate; and yet their fleeces, under good management, would yield good lustre wool. In the warm districts, I believe the open skins and lighter wools of the north of the county would be suitable, and might be introduced with profit. The fleece would be heavier than from the Leicester, and would yield lustre wool of an excellent quality, without a tendency to turn "mossy." As to the quality of the land and inferiority of herbage being objectionable, I would in refutation instance the Lincolnshire wold and heath districts. Within my memory I may venture to say that for tens of thousands of acres together the annual produce did not exceed three or four couples of rabbits per acre; now they are producing magnificent sheep in almost as many couples, and sheep's wool instead of rabbits' skins. Take the Cotswold district. It is not much richer, and yet it has long produced still larger sheep of beautiful form and character. *It is only a question of management.* As to their breeding qualities, I would say that they are not so prolific as some of the short-wooled sheep, nor are the ewes such good sucklers; but the yield of lambs raised in average seasons is about one-third "pairs," the rest "singles." They are not more trouble or expense in wintering than other kinds, nor are the casualties greater. As consumers, it has been repeatedly proved that, taking into consideration

the value of mutton and wool produced within a given period, few kinds of sheep can compare with them, and the quality of mutton is exceedingly good. It is certainly large in its proportions as butchers' meat, but no mutton can compare with it in the fineness of its lean meat, although not close-grained, and the quantity of lucious gravy it produces. I might further instance some extraordinary weights to which individual sheep of this breed have attained, which I take almost at random. No. 1, Mr. Clarke's of Canwick, two wether sheep, weight, 261 and 250 pounds respectively. Mr. Dawson's, of Witheal, No. 1, a three-shearer, 886 pounds; No. 2, two-shearer, weight 864 pounds; No. 3, shearling, 284 pounds. Mr. John Clarke's ewe, exhibited at Smithfield Club and the Newcastle meeting, 262 pounds. Mr. Coke, near Lynn, has at various periods exhibited many scores of this breed, which have averaged from 50 to 75 pounds per quarter. Mr. Plowright, near Spalding, has throughout many years shown, in his regular business sales, many hundreds of two-shear wether sheep to weigh from 30 to 45 pounds per quarter, and at this market, like specimens may be seen on almost every market day. And no doubt specimens of this breed will be exhibited at the new Agricultural Hall, to which I with pleasure refer. I would only now further observe that this breed is exciting great attention on the continent, and many breeders are introducing them on a small scale. Of course these considerations should induce every breeder of these longwools to renew his exertions to keep up their high character.

On page 519 of the Ohio State Agricultural Report for 1862 will be found a list of the principal flocks of Merinos and their grades. The law limiting the size of the report did not permit the insertion of the following tables; they are therefore presented here.

FRENCH MERINOS AND THEIR GRADES.

For the history of the French Merinos see page 479 Ohio Agricultural Report for 1862.

ATHENS COUNTY.

	Name and post-office address of the owner of the flock.	Bucks.	Ewes.	Quality of sheep.	Who commenced the flock.	When and where parents were obtained.
1	James H. Tibbles, Lottridge.	2	70	Fr. Merino..	Geo. Welkes......	L. Erie & Wash. co. Pa
2	James Dew, Trimble	3	75	..do.........	1835, J. D.......	1835, Athens, Ohio.

BELMONT COUNTY.

3	Jas. Johnson, St. Clairsville.	..	100	Fr. Merino..	....	

CUYAHOGA COUNTY.

	Name and post-office address of the owner of the flock.	Bucks.	Ewes.	Quality of sheep.	Who commenced the flock.	When and where parents were obtained.
4	E. Gibson, North Royalton	..	70	Full Fr. Meri.		
5	J. J. Bigelow, Parma	36	640	Half		Pa., Ia. and O.

COSHOCTON COUNTY.

6	Wm. & Cyrus Elder, Warsaw	6	100	Full Fr. Meri.		Penn.
7	Robert Darling, "	2	140	..do	J. Stevens	
8	Wm. Crouch, "	5	200	..do	—— Wheeler	Ohio.
9	John Taylor, "	3	150	..do	"	Penn.
10	John J. Hays, "	1	156	..do	Wm. M. Hays	"
11	Isaac Mitchell, Laings	4	152		1858, M. Boggs	Belmont co., O.

FULTON COUNTY.

12	A. R. Shute, A. J., Fulton co.	1	40	½ Fr. Merino	A. R. S.	
13	Owen Taylor, Winameg	1	50	..do		

GEAUGA COUNTY.

14	Stephen Walden, Middlefield	1	45	½ Fr. Merino	1860, S. W.	N. Y.

GALLIA COUNTY.

15	A. Barton, Kyger	8	200	½ Fr. Merino		
16	M. Titus	1	40	..do		

GUERNSEY COUNTY.

17	T. G. Brown, Londerry	8	100	½ Fr. Merino	T. G. B.	Washington co., Pa.

GREENE COUNTY.

18	M. Brownlee, Xenia	1	20	½ Fr. Merino		Clark co., O.

LOGAN COUNTY.

19	Asa Brown, Zanesfield	5	61	½ Fr. Merino	1856, Z. Brown	Addison, Vermont.

LAKE COUNTY.

20	Chas. Lockwood, Madison	1	40	½ Fr. Merino		Painesville.
21	F. Benjamin, "	1	50	..do		
22	Lewis Randall, "	..	35	..do		

MUSKINGUM COUNTY.

24	W. T. Talley, Rural Dale	2	60	Full Fr. Meri.	Jones, Vt.	Imported.

MONROE COUNTY.

25	A. T. Shotwell, Antioch	2	150	½ Fr. Merino	Brady & Duky	Brooke co., Va.
26	Absalom Martin, "	2	150	½ do	A. M.	Brady, Va.

MORROW COUNTY.

	Name and post-office address of the owner of the flock.	Bucks.	Ewes.	Quality of sheep.	Who commenced the flock.	When and where parents were obtained.
27	E. Weatherly, Chesterville ..	20	150	Fr. Merino ..	....	
28	Jerry Coleman, " ..	2	50	½ Fr. Merino.	....	
29	W. W. Nye, " ..	..	30	½ do......	....	
30	D. Miles, " ..	3	63	½ do......	....	
31	A. King, " ..	2	81	Merino......	....	

SUMMIT COUNTY.

32	Jas. Chamberlain, Tallmadge	3	100	¾ Fr. Merino.	....	Vermont.

TRUMBULL COUNTY.

33	Josiah Hine, Johnstonville ..	2	75	½ Fr. Merino	1840, J. H.......	1840, Johnston.
34	Nirum Hine, " ..	2	50	..do........	1850, N. H.......	1850, "
35	Henry Long, Hubbard......	..	150	..do........	....	
36	H. Green, "	..	116	..do........	....	
37	J. Daughton, "	..	300	..do........	....	

UNION COUNTY.

38	A. A. Woodworth, M. Centre.	9	400	½ Fr. Merino	A. A. W.........	Vt. and France.
39	J. R. Galloway, Irvin Station	8	200	..do........	J. R. G..........	Vermont.
40	R. D. Reece, Milford Centre.	7	300	..do........	R. D. R..........	Vt. and France.
41	J & E. Burnham, " .	4	90	½ to full ..	1851, J. & E. B...	" "
42	Wm. Harvard, Irvin Station.	10	200	Half........	....	
43	Jas. Miller, " .	10	400	..do	J. M.............	Vermont.
44	Nathan Howard, M. Centre..	8	135	½ to full....	1850, N. H.... ..	1849, Bingham, Vt.

VINTON COUNTY.

45	Francis Strong, Wilkesville..	2	275	½ Fr. Merino.	1860, F. S.......	Bucks, Pa.
46	J. Cobb, Salem Centre.... ..	6	270	..do........	1858, J. C.......	Bucks, Vt.
47	Jas. Titus, Rutland, Meigs co.	5	350	..do........	1859, H. Titus ...	"
48	Seth Paire, " "	..	100	..do........	1863, S. P.......	West Va.

WILLIAMS COUNTY.

49	Moses H. London, Montpelier	10	140	½ Fr. Merino.	1858, M. H. L....	Mass. and Vermont.
50	John Borton, West Unity ...	7	250	..do........	1858, J. B.......	Vermont,
51	T. C. Chander, " ...	2	96	½ do........	....	"
52	Anselan Jones, " ...	2	135	½ do........	....	"
53	S. Snider, " ...	4	100	½ do........	....	
54	H. Opdyke, Montpelier	6	46	Full	Jewett & Morse ..	1858, Vermont.
55	Jacob M. Hester, Pulaski ...	4	75	Half........	....	Lorain co., O.
56	Wm. Ayres, West Unity.....	2	90	..do........	East part State ..	

WARREN COUNTY.

57	Andrew Spence, Butlerville .	1	....	¾ Fr. Merino	1861.....	
58	Peter Boyd, Lebanon.... .	14	250	½ do.......	1854, C. Holloway	Maine.
59	Joseph Mesher, Waynesville .	33	50	Full	1850, J. M.......	Vermont.

WYANDOT COUNTY.

60	John Fowler, Little Sandusky	..	3	Fr. Merino ..	....	
61	Wm. Betzer, Belle Vernon ..	90	90	Half........	1850, W. B.......	Ohio.

WASHINGTON COUNTY.

[illegible]	Jas. Lawton, Barlow........	3	75	½ Fr. Merino.	....	Vermont.

No. 5.—My operations in sheep for the past fifteen years have been quite large. And having experimented on the different kinds, I now am prepared to say that a cross between the old French sheep and the native American do produce the most profit to sheep growers. In this cross I have no foot rot; a medium grade of wool, with heavy fleece, say from four to seven pounds; and they are decidedly the best for fattening.

Yours truly, J. J. BRYSTOW.

No. 15.—In the fall of 1845 I bought a few ewes, of what is called the Black Top Merino, very fine, indeed; and about six years ago I bought a French buck, his wool being long and fine. The sheep raised since I bought the French buck are said to be the best wool sheep in the country. My flock numbers 350 sheep, about 100 of which are coarse.

Yours in haste, A. BARTON.

No. 17.—I commenced with a small lot of the Wells & Dickison ewes, of Steubenville, purchased them of David Buchanan, of Washington county, Pennsylvania. I commenced my flock 35 years since, and have never made a change, only by change of bucks, and selling off the old ones. I purchased a Black Top buck the same time I purchased my ewes. Afterwards I purchased a buck from a sheep man, or his agent, of Washington county, Pennsylvania, of the same stock of sheep—Black Top Merino; I think the owners name was McGiffin. After many years I crossed with a French buck, sent into our neighborhood by a man in the northwestern part of Virginia; his name was Beekey. I have not purchased a sheep for the last 25 years, having raised all that I have kept, or have now. I have raised from 75 to 120 lambs every year, and our flock has ranged in number from 250 to 450; have now 220, the finest I have had for the last 15 years.

T. G. BROWN.

No. 36.—In addition to the list given in table I have about 50 sheep, the progeny a full blooded French buck and the common native ewes. These sheep are not quite as fine wool as the French and Spanish; are somewhat larger, and shear as much wool as the others; for domestic use are better than the others, are all very hardy and stand the winter better than the native sheep.

Yours truly, M. H. LOUDEN.

No. 37.—A portion of the parents of my flock were derived from Jewet & Hayes, who derived their flock from John A. Taintor's importation from

France, and a portion were derived from Jewet & Morris' importation from France.

Respectfully submitted, JOHN BORTON.

No. 38.—There has been a good deal of interest taken in the breeding of sheep in this vicinity for the last fifteen years. The old stock of sheep were brought from Pennsylvania in the early settlement of this county. The improvements that have been made in the old stock were importations from France, in the year 1848, and by the Spanish Merino, from Vermont. The object had in view by crossing is to increase the bulk of carcass, also the weight of fleece, and keep up the fineness of the staple. We think the Spanish Merino is the most hardy sheep of the various kinds we have tried, and of more real profit to wool growers than any other kind. Our sheep do very well without shelter, but much better with, from the cold winds and storms. The writer would recommend light sheds, partly open on one side, for good ventilation, and built on runners, to be moved from place to place, where there is a poor spot that needs enriching.

Your obedient servant, A. A. WOODWORTH.

No 41.—My flock of sheep consists of 4 bucks, 90 ewes and 86 last spring lambs. I generally winter from 160 to 240; sell my yearlings, or a portion of them, and some of the ewes, after shearing; so that my flock always consists of a few bucks, breeding ewes and lambs. They cut from 4½ to 4¾ pounds to the head. I started my present flock in 1851. Hon. A. P. Howard and Erastus Martin, of Wooster, Champaign county, imported, that year, French sheep, and I purchased a portion of them, and about the same time a few Spanish Merinos, from Vermont; my present flock is made up of these and their descendants, say 15 full blood French, 25 full blood Spanish, and the balance a cross from French buck on Spanish ewes. I find purchasers prefer French wool, because there is less shrinkage.

Yours truly, ELIPHAS BURNHAM.

No. 42.—I bought 30 ewes and 1 buck of Mr. William Thatcher, six years ago. He brought them from Lorain county. The name of the gentleman he (Thatcher) bought them of I do not now remember. I have now 160 head on hand.

Yours truly, JACOB M. HESTER.

SAXONYS AND THEIR GRADES.

For the history of Saxonys see pages 468 and 500, Ohio Agricultural Report for 1862.

ADAMS COUNTY.

	Name and post-office address of the owner of the flock.	Bucks.	Ewes.	Quality of sheep.	Who commenced the flock.	When and where parents were obtained.
1	Jas. Crose, Scot's P. O.......	1	20	Half Saxony.	J. C............	
2	Dan'l Ebright, Eckmansville.	1	40	Three-fourths	....	Washington Co., Penn.
3	James Carson, "	2	55	..do	....	" "
4	Paul Harsha, North Liberty.	2	35	..do	....	" "
5	Rob't Morris, Eckmansville..	1	21	..do	....	" "
6	T. C Wassen, North Liberty.	1	16	Half do....	....	" "

AUGLAIZE COUNTY.

7	Hugh Elliott, St. John's.....	6	200	Half Saxony and half Sp.	1840, present owner...........	Penn. and Vermont.
8	Martmah Horn, Rinehart....	..	...			

BELMONT COUNTY.

9	Chas. Bundy, Barnesville....	10	35	¾ Saxony....	....
10	James Gordon, Damon......	2	75	..do	....
11	E. Scatterday..............	1	80	..do	....

CLINTON COUNTY.

12	Matt. Rombach, Wilmington..	80	80	Full Saxony.	Linton & J.	Pugsley, 20 years ago.

CLARK COUNTY.

13	D. V. Pringle, S. Charleston.	5	150	Half Saxony.	....
14	D. Sprague,................	12	700	Three-fourths	....

CRAWFORD COUNTY.

15	Jonathan Dixon, De Kalb....	3	25	Full Saxonys.	Wm. Dixon......	Wash'ton, Pa., Wells & Dickinson's flock.
16	Geo. Dickson, Liberty Corners	4	50	Half do		

COLUMBIANA COUNTY.

17	N. H. Armstrong, E. Fairfield	5	50	Full Saxony.	1838, N. H. A.	Duchess Co., N. Y.
18	John Hisey, Columbiana....	10	80	..do	C. B. Smith, Ct.	1849, Saxony.
19	T. G. Rogers, E. Fairfield...	2	150	½ to full do..	1836, Jos. Rogers.	1836, N. Y.
20	J. & K. Raley, "	6	60	¾ to full do..	'33 or '34, T. Raley	N. Y. and Wash. co. Pa.
21	John Greiner. "	..	120	Full do	H. Kirtland......	Poland, O.
22	J. D. Raley, "	4	100	¾ to full do..	1845, J. D. R....	This neighborhood.
23	James G. Orr, New Lisbon..	2	75	Full do	1858, J. G. O....	John Stapleton, this Co., and Addison, Vt.

DELAWARE COUNTY.

24	H. M. Mattoon, Maxwell	2	50	Half Saxony.	R. Keeler........
25	G. Mann, "	1	75	"	S. Manndate.....

GALLIA COUNTY.

26	David Gates, Patriot.......	2	32	Half Saxony.	1860, D. G......	Gallipolis, O.

HOLMES COUNTY.

	Name and post-office address of the owner of the flock.	Bucks.	Ewes.	Quality of sheep.	Who commenced the flock.	When and where parents were obtained.
27	Peter Wise, Berlin	9	100	½ Saxony....	P. W............	Vermont.
28	Peter Longnecker, Winesburg	0	64	Half do		

HOCKING COUNTY.

29	J. D. Loomis, Logan	4	30	Half Saxony.	Moore & McClellan, Licking Co.	Vermont.
30	J. B. Rhodes, "	2	50	..do	....	
31	Jacob Rhodes "	1	60	..do	....	
32	Wm. Sheffield, "	1	100	..do	....	
33	C. W. James, "	2	100	..do	....	
34	Simeon Friesner, Logan	1	50	..do	....	
35	A. Culver, ...	1	50	..do	....	

JEFFERSON COUNTY.

36	Francis Scott, New Alexander	10	300	3-4 Saxony..	F. S.............	Wash. Co., Pa.

LOGAN COUNTY.

37	S. P. Johnston, Belle Centre.	6	260	Half Saxony.	....	Harrison Co., O.

LAKE COUNTY

38	Reuben Ford, Madison......	3	180	Half Saxony.	....	Vermont.

MONROE COUNTY.

39	Jno. Johnson, Malaga.......	1	55	Half Saxony.	1861, J. J.	Starbuck, Belmont Co.
40	Hugo Mann, "	1	50	do	J. Starbuck	do
41	Wm. Brown, Jerusalem	2	62	Full do	....	Harrison Co.
42	Dr. A. B. Covert, Antioch...	2	150	3-4 do	1861, J. Morton, Guernsey Co...	J. Singer, New Athens
43	J. D. McRight, " ...	1	60	3-4 do	Martin, Harrison Co..........	
44	Morris Covert, " ...	1	50	Half do	1861, E. Martin, Guernsey Co...	1861, Vermont.
45	A. O. Hutcheson, Beallsville.	10	200	do	....	Harrison Co.

MARION COUNTY.

46	Landy Shoots, Marion......	9	400	3-4 Saxony..	....	Marion Co., O.
47	A Monett, "	30	700	Half do	Jacob Booth.....	Mt. Carmel, Vt.
48	John Will, Latimberville,...	20	600	do	Jno. W..........	Wash. Co., Penn.
49	Robert Kerr, "	100	2100	do	R. K............	"
50	Jas. Werr, "	20	600	do	Jas. W..........	"
51	Robert Will, "	12	400	do	R. W............	"
52	Jas. Maler, "	20	400	do	....	"
54	E. Burt, Marion...........	17	375	do	....	Hammond & Hull, Vt.

MIAMI COUNTY.

55	Wm. Nettleship............	4	87	Half Saxony.	....	Vermont.

MUSKINGUM COUNTY.

	Name and post-office address of the owner of the flock.	Bucks.	Ewes.	Quality of Sheep.	Who commenced the flock.	When and where parents were obtained.
56	John Bell, New Concord....	..	150	Full Saxony.	....	Wash Co., Pa.
57	John Henderson, Norwich...	..	150	do	See circular	"
58	Wm. Best, New Concord....	..	150	do	"	"
59	Enoch Passmore, Norwich...	..	100	do	"	
	MAHONING COUNTY.					
60	Henry T. Kirtland, Poland..	50	....	Full Saxony.	1834, H. T. K.....	N. Y. and O.
61	C. F. " "	11	200	do	1851, C. F. K....	
62	Geo. P. " "	9	161	do	1861, G. P. K....	
63	Chas. N. " "	2	100	do	1858, C. N K.. ..	
	PORTAGE COUNTY.					
64	Alva Udall, Hiram. O......	10	200	Full Saxony.	1848, A. M.......	S. B. Crocker, Oneida Co., N. Y.
	PERRY COUNTY.					
65	Isaac C. Hull, Somerset.....	4	180	3-4 Saxony..	1843, I. C. H.....	Ewes, Penn.
66	John S. " "	2	112	Full do	1847, J. S. H.....	"
67	Israel Moore, Fultonham....	4	130	3-4 do	....	"
68	James R. Wilson, Somerset..	2	100	Half do	J. R. W.........	"
69	Isaac W. Cooper, "	1	100	Full do	I. W. C..........	"
	SENECA COUNTY.					
70	Thos. Thompson, Republic...	4	30	Full Saxony	1850, T. T.......	1850, Jefferson Co., O.
71	G. Starns, "	12	421	Half do	1840, W. Treet...	Tompkins Co., N. Y.
72	Robt. Shaw, "	6	510	do	1831, Baker.....	"
73	E. Y. Stickney, "	8	809	do	1836, E. G. S....	Vermont.
74	Wm. Anway, "	5	680	do	1830, W. A......	N. Y.
75	J. W. Eastman, "	4	700	do	J. Baker.........	"
	TRUMBULL COUNTY.					
76	John Randall, Hubbard.....		230	Half Saxony.	....	
77	Jos. Bentley, "		200	do	....	
78	Morris Cole, "		250	do	....	
79	Robt. Hassen, "		150	do	....	
80	Andrew Kirk, "		100	do	....	
81	Jas. Bentley, Brookfield.....		250	do	....	
82	Wm. Wheeler, "		300	do	....	
83	Wm. Lafferty, "		150	do	....	
84	R. S. Hart, "		350	do	....	
85	Smith Clark, "		200	do	.... [ery.	
86	Abram Brown, Hubbard....	3	101	Full do	1821, R. Montgom-	Wadsworth, N. Y.
	" "		49	Half do	"	"
87	H. T. Mason, Niles.........	2	60	3-4 do	1849, H. T. M.	Wash. Co., Pa., and Vt.
	UNION COUNTY.					
88	Solomon Cook, Raymond....	25	375	Half Saxony.	See note.........	

WASHINGTON COUNTY.

	Name and post-office address of the owner of the flock.	Bucks.	Ewes.	Quality of sheep.	Who commenced the flock.	When and where parents were obtained.
89	J. L. Malster, Palmer........	..	50	Half Saxony.	1856, W. M.....	1856, Wash. Co., Pa.
90	J. Breckinridge, "	4	50	do	1855, J. B......	1855, Pa. and Vt.
91	Martin Palmer, "	2	50	do	1850, M. P......	Dana flock of this Co.
92	Isaac Coler, Bartlette.......	5	100	do	1853, J. C.......	1853, Jefferson Co., O.
93	J. Coulter, "	25	150	do	1855, J. C. C....	1855, Bucks from Vt.
94	Daniel Shaw, Veto..........	5	100	do	1856, D. S......	Vt. and Wash. Co., O.
95	Wm. R. Putnam, Marietta...	10	200	do	1830, W. P......	1830, Pa.
96	Dana Steirs, Beverly........	20	700	do	1830, B. Dana..	1830, Pa.
97	H. McKey, Lowell..........	4	100	do	1861, H. McK...	1861, this Co.
98	G. Curey, Lower Salem..[ly.	10	50	do	1860, G. C.....	1860, this Co. [son.
99	Miss S. M. and C. Dana, Bever-	12	800	Seven-eighths	1819, B. Dana...	1819, Wells & Dickin-
100	B. Shaw & Son, Coral Run...	4	100	Three-fourths	1841, B. Shaw...	1841, Benj. Dana.
100	W. Worsdel, Beverly.........	..	100	Half do	....	

WYANDOT COUNTY.

102	S. M. Fowler, Lit. Sandusky	5	200	Full Saxony.	1854, S. M. F....	'54, Harrison Co., O.

No. 7.—The sheep are generally common with a few slight crosses of Spanish.

HUGH ELLIOTT.

No. 13.—I have 500 sheep; the original stock was Saxony. I crossed with the Southdown and then with the Spanish. I now have the best shearers I have ever kept. My flock averaged 4½ pounds last spring—all stock sheep. I am not able to give the original stock, as they were brought to this State some twenty years ince, by Mr. Pearce, from Pennsylvania.

D. V. PRINGLE.

No. 16.—Our section of country is well adapted to the raising of sheep. Sheep in general have done well this winter, they generally being grain fed, which is very essential to the growth of a good crop of wool. Five years ago I bought a Vermont buck, paid $20.00; 2 years ago I bought a Vermont buck and paid $30.00. The latter sheared this season about 17 pounds. It was about half washed.

GEORGE DICKSON.

No. 18.—I have owned my flock eleven years, and have not crossed them with any other than the same bred in-and-in. They were imported from Baron Sprecks' flocks of Saxony in 1849, by Chas. B. Smith, of Wolcotville, Connecticut. I think my present flock are better than the original sheep when imported. I should like to cross my sheep, but I have not found any in this country, but would spoil the style of my wool.

Yours, JOHN HISEY.

No. 26.—The common varieties are found here on nearly every farm, in small flocks, varying from ten to fifty. Wool growing is in its infancy here.

DAVID GATES.

No. 37.—As regards quality, my wool will grade with the first flocks of Saxony in Harrison county. My flock is a cross of the full blood Saxony ewes, with the full blood Spanish bucks. In the year 1851 I moved from Harrison county to this county. I then owned a flock of 400 head of Saxony Merinos, from which I assorted 100 choice ewes and brought them with me. I afterwards bought some thirty head of ewes, raised by Samuel Patterson, of Washington county, Pennsylvania, nearly of the same grade of my own. This was the commencement of my present flock. Up to the fall of 1856 I bred chiefly from bucks that I brought with me from Harrison county. Being convinced from my experience, observation and reading, that the Spanish sheep are the best sheep in the world, I came to the conclusion that I would henceforth breed from Spanish bucks, and I have done so. The first Spanish buck I obtained was from Mr. Hammond's flock, of Vermont—a choice animal; his fleece weighed 14 pounds, clean, unwashed wool, one year's growth; would compare with Saxony wool in quality. My second purchase of Spanish sheep consisted of 10 ewes and two bucks—my choice from 100 head bred in Vermont. My third purchase of Spanish sheep was made last October, consisting of five ewes and one buck, thoroughbred; the buck and two of the ewes bred by H. F. Dean, one ewe by Robison, one by Wilson, one by Hammond—all thorough breeders of Vermont; four of those ewes are with lamb to Mr. Campbell's famed young buck, of Vermont, exhibited at Cleveland fair, and also Detroit, Michigan, last fall. I have some twenty head of full blood and thoroughbred Spanish ewes. I believe the secret of success in obtaining an extra flock of sheep is in always breeding from select choice bucks, and never from exceptionable ewes. I might say more, but I presume you wish brevity. I may say that my flock pleases myself as regards quality of wool, (and I have had an experience in the wool growing of some thirty years,) but lacks in quantity, averaging 4½ pounds of well washed wool to the clip. However, having last year sold my lightest shearers, by judicious management I confidently expect an increase of quantity, and in that way expect to be repaid for my outlay of thorough breeds.

Yours truly, SAMUEL P. JOHNSTON.

No. 42.—I have given you a brief history of a few flocks in the neighborhood. In this county it is supposed there are about 30,000 sheep, and, as a general thing, the sheep are not *pure bred;* many of them have been

picked up within the last five or six years, of flocks in Harrison, Guernsey and Belmont counties. But at present there is in this county quite a disposition to invest capital in sheep, and also to improve the blood and weight of fleece.

DR. A. B. COVERT.

No. 54.—We have been in the sheep business for eighteen years, and from my experience I would say to all to get Spanish sheep, if they want to make anything in the sheep business.

Yours truly, E. BURT.

No. 60.—In 1834, two bucks and twelve ewes, from Duchess county, N. Y., brought to Ohio by Cope & Marsh, who resided in Columbiana county, O.

In 1841, buck, of Nathan Armstrong; 1841, bucks and ews, of Dr. Stough; 1842, bucks and ewes, of A. Marsh, each of Columbiana county, Ohio.

1845, bucks and ewes, of Cyrus C. Taylor, Granger, Medina county, of H. D. Grove, flock, Ohio.

1845, buck, of Mr. Wallace, Brandywine Mills, Ohio.

1845–6, buck and ewes, from the flock of Samuel Patterson, Washington county, Pa.

1845–6, bucks and ewes, from the flock of Samuel Cole, Washington county, Pa.

1845–6, bucks and ewes, from the flock of Mark R. Cockrill, near Nashville, Tennessee.

1846, buck, from flock of Perkins & Brown, Akron, Ohio.

1846, ten ewes, from the flock of Charles B. Smith, Wolcottville, Connecticut.

1849, bucks and ewes, from the flock of Charles B. Smith, Wolcottville, Connecticut.

1853, H. T. Kirtland & John Hisey purchased a buck, No. "70," imported by Catlin & Smith, from the flock of Maximilian Baron De Speck, near Leipsic, Saxony. C. F. Kirtland, the same year, bought of C. B. Smith, 1 buck and 16 ewes.

1859, C. F. Kirtland purchased a buck of Anthony Hoffman, of Duchess county, N. Y., imported from Silesia.

Nine-tenths of the flock now are from the ewes obtained of Charles B. Smith and buck No. 70, and his descendants.

Respectfully yours, &c., C. F. KIRTLAND.

No. 64.—I am now crossing my ewes with Silesian bucks, obtained from Wm. H. Ladd, of Richmond, Jefferson county, Ohio, with a view of

increasing weight of the fleece; which I intend to do without essentially increasing the size of fibre. I have bred my Saxons in such a manner as to secure a good constitution; short legs, round compact body, full breast, and they are now a hardy, strong constitutional sheep. Have sheared, of clean washed wool, on the average, three pounds, the flock through; for which the average price obtained for a term of years has been (delivered at my barn) from 60 to 68 cents per pound.

Respectfully and truly yours, ALVAH UDALL.

No. 100.—The Dana flock is the oldest and largest flock in the county. I believe the flock when started by Benjamin Dana, were called the Black Top Merino. This was in 1819. From that time until 1859, they were crossed on Saxon bucks, from the best flocks of Pennsylvania and Virginia. Since 1859 the cross has been with the Silesian.

Respectfully yours, WM. B. SHAW.

SILESIANS.

For the history of Silesians see page 472 of Ohio Agricultural Report for 1862.

WYANDOT COUNTY.

	Name and post-office address of the owner of the flock.	Bucks.	Ewes.	Quality of sheep.	Who commenced the flock.	When and where parents were obtained.
1	S. M. Fowler, Little Sandusky	15	200	Full Silesian.	1856. S. M. F...	1856, Harrison co.
2	do do do	..	200	Half do	1858. S. M. F...	1858, do
3	F. F. Fowler, Up. Sandusky..	17	500	Three-fourths	F. F. F..........	Harrison co.
4	Jos. Parker, do	2	50	do	Ladd	Ladd.
5	Wm. Walton, Tymochtee....	7	100	do	L. G. Ranger....	Ladd.
6	J. M. Ellis, Belle Vernon....	2	50	do	Wm. Gregg......	Ladd.
7	Henry Parker, Tymochtee...	3	30	do	L. G. Ranger....	Ladd.
8	D. Smith, Up. Sandusky.....	6	17	Full Silesian.	....	Up. Sandusky.
9	O. Parker. Belle Vernon.....	2	100	Half do	....	

No. 1.—The flocks of sheep I have named above, were mostly from imported bucks, and crossed with the common sheep of the neighborhood. They are a very healthy quality of sheep, and are considered among the best. The modes of wintering are various, as hardly two farmers winter their stock alike—some feed hay, some corn-fodder, and others corn and fodder; but there are very few stall fed sheep in this part of the country.

Very respectfully yours, &c., THOS. J. HAUGHEY.

No. 1.—I am breeding more for wool than for carcass. My experience in the above varieties of sheep is that the Saxony sheep are too delicate for this climate, and too light fleeced to be profitable. Silesians are better, but to some extent labor under the same difficulties of the Saxonys. I am well pleased with the cross of the Spanish Merino, and have procured, at very high prices, some of the thorough breeds, from the best flocks in the State of Vermont, for the purpose of breeding a flock of that kind of sheep.

Yours respectfully, SCOTT M. FOWLER.

SOUTHDOWNS.

For history of Southdowns, see page 430 of Ohio Agricultural Report for 1862.

ADAMS COUNTY.

	Name and post-office address.	Bucks.	Ewes.	Quality of sheep.	Who commenced the flock.	When and where parents were obtained.
1	R. Alexander, Eckmansville.	1	40	Southdowns..	R. M. A.	
2	F. Clark, Scots P. O........	1	25	do	F. C............	
3	N. B. Roush, Eckmansville..	2	33	do	N. B. R.........	
	ASHLAND COUNTY.					
4	Thos. Bushnell, Haysville...	6	80	½ Southdown.	....	Ky, Iowa, Vt. and O.
	ALLEN COUNTY.					
5	Gabriel Heffner, Westminster.	4	100	½ Southdown	....	
6	A. E. Kerr, do	6	100	do	....	
7	Samuel Ice, do	..	100	do	....	
8	J. H. Drake, Bluffton.......	10	315	do	....	
9	L. Jennings, Beaver Dam ...	1	50	do	....	
10	R. McKee, do ...	..	200	do	....	Imported.
11	Hugh Dobbins, Lima.......	1	25	do	....	Clark county, O.
	ATHENS COUNTY.					
12	I. Stanley, jr., Hibbardsville	3	200	Southdown..	....	
13	Oliver Bassett, Athens.....	1	15	do	....	
14	Wm. Campbell, Lee P. O....	..	20	do	W. C.	Meadow Bluffs, W. Va
15	Edward Blake, do	..	75	¾ do	E. B	Ohio.
16	Samuel Wines, do	..	350	do	....	Ohio.
17	Moses Patterson do	1	50	½ do	M. P............	Ohio.
	BUTLER COUNTY.					
18	Wm. Black, West Lafayette..	5	100	Southdown ...	....	
	CLERMONT COUNTY.					
19	A. Oskamp, Miamiville.....	2	75	Southdown...	....	
20	H. Buckingham, do	..	30	do	....	
21	Jacob Thompson, do	..	72	do	....	
22	Wm. Goff, Williamsburg.....	4	96	½ do	....	
23	Geo. Leming, Parentown.. .	4	98	do	....	

CUYAHOGA COUNTY.

	Name and post-office address of the owner of the flock.	Bucks.	Ewes.	Quality of sheep.	Who commenced the flock.	When and where parents were obtained.
24	Ed. Davis, North Royalton..	4	40	½ Southdown.	1853, E. D.......	Shropshire, England.
25	Chas. Erswell, do ..	.	100	do	....	
26	W. Tilby, do ..	..	50	do	....	
27	G. Abrams, do ..	..	20	do	....	
28	L. Lovejoy, do ..	..	25	do	....	
29	O. Claflin, do ..	..	20	do	....	

COSHOCTON COUNTY.

30	Geo. Clarke, Warsaw	..	50	Southdown ..	J. Stevens	Knox county.
31	Uriah Brisker..............	1	50	½ do	U. B............	

CRAWFORD COUNTY.

32	James Kerr, Bucyrus	5	30	Southdown..	....	

COLUMBIANA COUNTY.

33	J. & K. Raley, E. Fairfield..	3	4	¾ Southdown	....	W. Chester, Pa. & N J

DEFIANCE COUNTY.

34	A. P. Egerton, Hicksville ..	..	60	Southdown..	....	

FRANKLIN COUNTY.

35	A. Livingston, Reynoldsburg	1	5	Half to full Southdowns..	1855, A. W. L..	Smith Farm, Ky.

FULTON COUNTY.

36	Wm. Fewlas, Delta........	1	50	½ Southdown	W. F...........	

GREENE COUNTY.

37	C. A. Haughey, Bowersville	3	250	Half Lincolnshire.	Major Hunt, of Clark county, O..	England.

HAMILTON COUNTY.

38	Samuel Dunn, Lockland....	..	110	½ Southdown	....	Cincinnati, O.

LORAIN COUNTY.

39	Samuel Toms, Elyria	18	60	Southdown ..	S. T............	England.
40	Mr. Oslander, Ridgeville ...	1	25	½ do ..	....	
41	Harry Terrill, do ...	1	30	½ do ..	....	
42	Jas. Longworth, Eaton	3	40	½ do ..	....	
43	Mr. Saxton, Columbia	2	20	¾ do ..	....	
44	L. D. Byington, Russia	2	40	¾ do ..	....	
45	Thos. Binnington, La Port..	5	60	½ do ..	....	England and Canada
47	Samuel Toms, Elyria.......	1	3	Full Hampshire Downes	S. T	England

LOGAN COUNTY.

46	A. A. Harbison, Huntsville.	1	20	Southdown..	1856, A. A. H...	

MAHONING COUNTY.

48	Wm. Creed, Cortsville......	3	75	Southdown ..	....	
49	J. H. Shields, Youngstown..	2	20	do ..	J. H. S.........	1860, England.

MARION COUNTY.

	Name and post-office address of the owner of the flock.	Bucks.	Ewes.	Quality of sheep.	Who commenced the flock.	When and where parents were obtained.
50	Wm. Garberson, Calidonia..	2	20	¾ Southdown	....	Allen of N. Y.
				MEIGS COUNTY.		
51	Abner Stout, Chester	2	80	½ Southdown	1859, A. S	Athens county.
				ROSS COUNTY.		
52	R. R. Seymour, Bainbridge.	10	400	¾ to full Southdown ..	R. R. S.........	Clinton and Fayette co., Importing Co.
				TRUMBULL COUNTY.		
53	Elijah Hutchins............	..	....	Southdowns..	....	
				WARREN COUNTY.		
54	L. W. Ludlum, Butlerville.	5	30	¾ Southdown	Shakers	
55	Richard Skinner, do	1	....	Southdown ..	....	Warren county.
56	Geo. Carson, do	..	15	do ..	....	
57	Israel Lundy, do	..	75	½ do ..	....	
58	Martha Seaman, do	..	5	½ do ..	....	
59	John Armstrong, do	..	50	⅜ do ..	....	
60	Jacob Clark, do	..	14	½ do ..	....	
61	Jacob Ferguson, do	..	15	½ do ..	....	
62	Isaac Nichols, do	..		¾ do ..	....	

No. 4.—My flock in all is 110 and three lambs. In 1859 I bought of James Childs, Blachleyville, Wayne county, a Leicester buck, that had just arrived from Bourbon, Ky., his weight was 284 pounds; price $25. His stock from long wooled ewes was large, with open wool, showing the Leicester blood; but those from fine ewes were thick, close wooled, heavy bodied, short legged and long wooled; they are good sheep. I have 25 sheep that were brought from Indiana; they are what we used to call natives (there is no such things as natives); they have long legs; the males have horns; the wool light and open; the belly and legs are bare; they are great feeders and great jumpers—poor sheep. I have some sheep from Washington county, Pa., called Black Top Merinos; small sheep, with very short and very fine wool; fleeces but three pounds; they are tender and the lambs hard to raise. I have some that I suppose was descended from the flock of Wells & Dickinson, similar to the above Southdowns—they are beauties. I have some half blood, quarter blood and eighth blood, but as long as the face and feet are speckled the lambs will be thrifty and the sheep will always be clean, fat and plump. The lambs are easily raised. I breed from half blood Southdown bucks, for the want of better. All sheep are profitable, but, I suppose, the pure Spanish, lately introduced from Vermont, are the most profitable of all; they have heavy bodies, short legs, and are wooled all over, head, belly and legs. The wool

is very thick and heavy; the fibre is twice as long as the Washington county or Black Top Merino; they are quiet and docile, and do well in large flocks. There are several flocks in this township. But the most of the sheep here are what we call middle wool. I have a number of them; they are a mixture of all bloods, by such a multitude of crosses that no man can describe. I have lived on this farm forty one years, and have had the care of sheep all my life, and they have been constantly crossing all of that time. The result is, we have a most valuable sheep, far superior to the original stock, that I called natives; they have short legs, very heavy bodies, long and thick wool, are good feeders, very quiet, fleeces are heavy, and the wool now sells higher than any other. One of their most valuable qualities is that they are very prolific, very frequently producing twins, and generally raising them. We have some flocks of Saxonys; their fleeces are too light and fine for *war* times.

THOS. BUSHNELL.

No. 6.—I purchased thirty common ewes from 'Squire Grub, in Allen, near Lafayette, in 1860, and bred them to a full Southdown buck, that I purchased of James Kerr, in Crawford county, Ohio. He was bought by James Kerr at the Dayton fair, and taken to Bucyrus, then I purchased him, bred from him two years; then I purchased a French Merino buck, that had taken the first premium at the Lima fair, in 1860. I am breeding fifty ewes this season. I have purchased a full blood Spanish Merino buck; I am breeding a few ewes to him. I have purchased some 35 Black Top Merino ewes, which I am breeding to my French buck.

A. E. KERR.

No. 8.—Our whole flock, including wethers, is 587. We are feeding for market 262 wethers, of the different crosses, to ascertain the true value of the different grades.

J. H. DRAKE.

No. 11.—The flocks of sheep in our county are mostly small. And until within a few years there has been but little attention paid to wool growing in this county. With the exception of the flocks of Slutts, Baker & Cook, they have been mostly grown from sheep brought here years ago, and, therefore, the history of their foundation cannot, with any degree of certainty, be given.

Yours truly, HUGH DOBBINS.

No. 18.—I had last fall something over 200 head of sheep; but, owing to the dry fall, my lambs began to fall off. I had to drive them to water as far as two miles, and then some of them would not drink. I believe I have lost from 8 to 10. Nine years ago I landed in America, and since that time I have been improving my stock. I have now a good stock. I don't call them quite pure Southdowns, although they are good. I have taken every premium at the Coshocton County Fair for the last four years; I had thirteen premiums gave to me; I did not take but eleven of them last fall. Some judges say they are the best stock of Southdowns in the State, but I don't say that. Now I say that I believe I have some as good blood as can be found. I have been raising from Mr. Jonas Webb's stock, of England, and he is said to be the best breeder in England. He thinks he can challenge the world—that is a large word. Mr. Webb had a sale in 1861, on the 10th of July; the number of sheep he sold was 967, which made £10,926, English coin, and when you add that up, I think you will find it to be over $50,000. I first began my stock of sheep with a man by the name of Baine; he went himself and brought them pure from England. The next I bought from a man by the name of John Worth, of Pennsylvania, five ewes and a ram, which was raised from Jonas Webb's stock; the sire of the above ram was by a ram Mr. Jonathan Thorn bought of Mr. Webb, which was the highest priced buck at Mr. Jonas Webb's selling, his price was 130 guineas; his dam by Prince, bred by Mr. Jutere, near Albany; his grand dam was imported by John Elman, from England. I have some I bought since of the best blood I can get. At Webb's sale his choice ram was called Reserve. He would not let him be sold for $2,000 until he had kept him from July 10th till October 15th, then he sold him. I have a ram from him. Reserve was by Young Plenipotentiary; dam Young York; grandam by Southampton, the first prize yearling of the Royal English Agricultural Show, at Southampton. Mr. John Worth sent ten ewes to Reserve, and paid $10 for each ewe, and more than that he paid over $3 per head for carriage. I have ewe stock from other bucks of Mr. Webb's. I have some by England, which was sold at Webb's sale for $1,300; he was by the sire of the first prize yearling at Canterbery; dam by the Little Sheep; dam, the mother of Vigor. I have ewe stock from Webb's favorite dam by Prank. I have three yearling bucks by the ram I bought of Mr. John Worth. I mean to sell the sire next fall.

William Black.

No. 24.—After a lifetime spent among sheep, and having had several breeds, I have come to the conclusion that sheep crossed from the South-

downs and Leicesters, or Southdowns and French are the most safe and profitable, either for mutton or wool, and are also the best adapted for this climate; and I am certain they are a great deal the easiest kept.

Yours respectfully, EDWARD DAVIS.

ANSWERS TO QUESTIONS.

No. 33.—1. H. Pyle, East Fairfield, Columbiana county, Ohio.

2. Number of bucks, 3; variety, Southdowns.

3. Number of ewes, 49; variety, 30 half-blood Cotswolds, 18 Downs and one half-blood.

4. My flock is composed of thoroughbred Southdowns and half-blood Cotswolds, except one ewe.

5. Most of my flock may be considered first quality.

6. My flock of Cotswolds was commenced by myself in 1857, by a cross from Cotswold bucks, brought from Chester county, Pa., on good three-quarter blood Merino ewes—the result has been quite satisfactory. My flock of Southdowns was commenced in the fall of 1862, by T. P. Davis, of West Chester, Pa.

7. Fourteen of my Southdown ewes were selected from the flocks of John Worth and Lewis Hoops, and two from C. Jackson, of John Hoop's stock, all of West Chester, Pa., in the fall of 1862; and the parents of three others of my flocks were brought here in 1861, from West Chester, Pa.

My buck No. 10, which I used this season, was purchased at J. C. Taylor's sale, of Holmdel, N. J., on the 3d of September last, he was sired by Reserve; dam's sire, Young York.

One ram lamb, Prize, sired by World's Prize.

One ram lamb, 89, sired by No. 89; purchased by J. C. Taylor, at Jonas Webb's sale, in England, 1861, for which he paid $1,300.

No. 35.—I purchased a Southdown buck in the fall of 1855, of J. N. Laughead, of Union county, and he of his brother, D. Laughead, of Greene county, and he from the Smith farm, of Kentucky. I crossed the above buck with a half blood Black Top Merino ewe, and from their increase I exhibited at Zanesville and took the second premium on middle wool aged buck; weight 197½ at two years old. I sold the ewes at $8 to $10 each, and the bucks from $10 to $20 for full bloods; the half-bloods I sold for an average of $8 per head. I consider the above mixture the best grade for us who live near market. The ewes are good breeders, and when mixed, as above, average five pounds of wool; always fit for market, when others in the same flock are thin; can stand hardship

better than a mixture of Cotswolds with Merino, their wool being too open.

Yours respectfully, A. W. LIVINGSTON.

No. 37.—In November, 1860, I purchased of a butcher in Cincinnati, some 260 sheep, of the common coarse wooled variety. These were brought from Indiana. I suppose gathered up from different flocks. I cannot give the origin of any of them except by their appearance. Some of them are about quarter Southdowns. These breed much the largest and best lambs. I paid $3 per head for all; fed them all alike; sold the wethers in February at four cents gross, with a good profit; kept 100 ewes; they raised about one lamb apiece; I sheared the ewes, getting 3½ pounds from each; sold at 42½ cents per pound. The lambs were sold to the butcher at five months old for $1.75. Last year I wintered 110; raised 100 lambs; sold sheep and wool, amounting to $425. To-day I sold my whole flock for $310, making in all $735 in one year.

Respectfully yours, SAMUEL DUNN.

No. 44.—My pure Southdowns I bought of Mr. Thos. A. Niber, and he bought them of Mr. Hulbert, near North Leach, Gloucestershire, England. They are the largest Southdown bucks and ewes that have ever been brought to Canada. The stock has been very much increased in size, and improved in various ways. They have never been crossed with Hamp. shire Downs, nor any other kinds. They are of pure blood. My flock are from the same.

Yours truly, THOMAS BENNINGTON.

No. 47.—I raised twenty-four; twelve were thoroughbred Cotswolds; nine were thoroughbred, cross between Leicesters and Cotswolds; three thoroughbred, cross between Saxony and Cotswolds. Amount of wool at one year old, 7½ pounds; two years, 8½ pounds. Amount of grain fed from November to May, one quart of meal, composed of corn in ear and oats ground together, per day, to each sheep; weight, average at two and a half years, 184 pounds.

J. H. SHIELDS.

No. 49.—There are but two flocks of sheep that number over thirty. They are called the common wool. There is but little interest manifested in the direction of wool-growing in this vicinity, and are but few fine wool sheep.

Yours respectfully, A. STOUT.

No. 50.—My flock of sheep number nearly 400, mostly ewes, 200 of which are Southdowns; some half, three-quarter, seven-eighths, and many full blood. I bought a buck and ewe at the sale of imported stock, by the Clinton and Fayette Importing Company; crossed them with a stock of mixed blood, of Saxony and the old Merino. A few years afterward I purchased a fine Southdown buck, raised by Mr. James Anderson, of Ross county, O.; he, I think, bought a number of them at the sale of the Madison County Importing Company. The balance of my flock I purchased in Kentucky; they are a mongrel breed—crosses of Bakewell, Cotswold, Merino and native. The value of the Southdown consists in the superior qualities of the mutton, and also the economy in producing it. They are a hardy sheep, producing about four pounds of wool, of a coarse quality, and a majority of the ewes will produce and rear twin lambs if properly cared for.

Yours respectfully, R. R. SEYMOUR.

COTSWOLDS.

For history of Cotswolds see page 447 of Ohio Agricultural Report for 1862.

ADAMS COUNTY.

	Name and post-office address of the owner of the flock.	Bucks.	Ewes.	Quality of sheep.	Who commenced the flock.	When and where parents were obtained.
1	James Cross, Eckmansville..	1	20	½ Cotswolds .	J. C.............	
2	N. B. Roush, " ..	2	34	..do.........	N. B. R..........	
3	John Work, " ..	1	32	..do.........	....	Mason co., Ky.

ATHENS COUNTY.

4	Isaac Stanly, jr., Hibbardville	3	200	Cotswolds . .	....	
5	Daniel Drake "	2	40	..do........	....	

CLERMONT COUNTY.

6	S. R. Hutchinson, Miamiville	..	5	Cotswolds. .	....	

CHAMPAIGN COUNTY.

7	T. S. McFarland, Westville..	1	25	Full Cotsw'ds	1860, T. S. McF..	Harrison co., Ky.

CUYAHOGA COUNTY.

8	W. Leuty, Middlef'd Centre.	7	71	Full Cotsw'ds	1849, R. Jackson.	1849, England.

COSHOCTON COUNTY.

	Name and post-office address of the owner of the flock.	Bucks.	Ewes.	Quality of sheep.	Who commenced the flock.	When and where parents were obtained.
9	Isaac Mitchell, Laings	..	2	Cotswolds...	1858, M. Boggs...	Belmont co., O.

HOCKING COUNTY.

10	J. Matthias, Logan.........	2	100	½ Cotswolds .	....	

HAMILTON COUNTY.

11	Jacob Shuff, Sharonville	2	18	Full Cotsw'ds	....	
12	G. W. Smith, "	..	24	..do........	....	
13	John Hammel, Carthage	3	250	Half........	....	

LORAIN COUNTY.

14	Wm. Squire, Capopa.........	3	29	Full Cotsw'ds	1850, W. S.......	1850, Lorain co., O.
15	Thos. Aston, Elyria........	17	62	..do........	T. A.............	Imported England.

MAHONING COUNTY.

16	Geo. Rudge, Boardman.....	10	40	½ to full Cots	G. & J. Rudge...	England.
17	And. Shields, Youngstown ..	5	100	Full.. [wolds	1860, A. S.......	1860, England.
18	J. B. Kistler, Cornersburg...	1	40	Half........	Rudge & Bro.....	1851, "
19	Milo Beard, " ...	2	80	..do........	1856, M. B.......	1856, "

MUSKINGUM COUNTY.

20	Mrs. McCammon, W. Zanesv'e	..	50	Cotswolds . .	....	

MORROW COUNTY.

21	Jos. Furnar, jr., Waynesville.	1	10	Cotswolds...	A. P. O'Neale ...	

MARION COUNTY.

22	T. V. Reber, Upper Sandusky	..	30	Cotswolds...	....	Vermont.

OTTAWA COUNTY.

23	H. H. Bredbeck, Port Clinton	2	50	¾ Cotswolds .	1858, H. H. B....	T. Aston, Lorain co. O
24	Gerett Bredbeck, "	2	40	..do........	1859, G. B.... ..	" "

SRNECA COUNTY.

25	Henry Troxel, Republic.....	1	60	Full Cotsw'ds	1860, H. T.......	Ky.
26	H. Huber, Tiffin............	1	40	..do........	1860, Huber.....	Ky. (Lexington).

RICHLAND COUNTY.

27	Matthew Briggs, Plymouth..	10	24	Cotsw. thor'd	Wm. Briggs, Sen.	B. & Tate, Bedford, O

UNION COUNTY.

28	A. Erwin, Irwin............	3	100	½ to full Cotsw.	H. Stocks.......	

No. 7.—On the 1st of September, 1860, I brought from Kentucky four head of pure-blooded Cotswold sheep, and on the 5th day of this month I brought fourteen head more, all and each of which will produce twelve pounds of merchantable wool. They were purchased of Robert Scott, Esq., of Harrison county, Kentucky, at an average cost of $12 per head. They have been remarkably healthy thus far, are excellent feeders, and are remarkable for their gentility and kindness.

In a few days I will go again to Kentucky for a car load, and as soon as I return I will notify you of my importation, if desirable. I think them far the best for home consumption, both wool and carcass. Some of my best will weigh three hundred pounds—average, two hundred and twenty pounds.

T. S. McFarland.

No. 13.—I take the present opportunity of furnishing such information as I can from my own experience in sheep raising for the year 1862. I kept three hundred; and from two hundred and fifty ewes raised about two hundred and fifty lambs, fifty of which I selected and kept, the rest I sold for $2 per head when three months old. Fifty wethers when shorn I sold for $3.75 per head. My wool brought sixty cents per pound, and on an average for the flock, $2.18 cents per head, which gives a net profit per head for 250 ewes and fifty wethers, as follows:—

Lambs, 200, at $2 per head	$400 00
Wool, 250 sheep at $2.18 per head	525 00
Wethers, 50, $3.75 per head	187 50
Wool of same	109 00
Total for whole	$1,221 50

The fifty lambs selected will fill the place of the wethers sold, and leaves the flock as good as last year. I should state that my lambs came about the 1st of March, and the ewes were housed and carefully tended. Earlier lambs would be better for the butcher, but would be more likely to be lost. My manner of keeping is to feed corn once a day, and then let the flock run out on the meadows, with hay at night when they return to the yard. If the farmers would keep sheep instead of dogs, it could be done with profit. A farm of one hundred acres could keep fifty and not feel the expense, while the profits would be handsome.

Yours with respect, John Hammel.

No. 14.—I first bought of Mr. Joel Townshend, of Avon, in 1850, one buck and three ewes. In 1852 I got from him another buck and ewe; in 1854 another buck from him, and in 1856 another one. These were crossed with Leicesters and Cotswolds. Since then I have crossed with a Cotswold

imported from England by Mr. Humphreys of Parma. The last buck I imported from Canada in 1861, bred by Mr. John Snell was a Cotswold.

My flock now consists of fifty-six sheep, viz: 3 buck lambs ten months old, weighing 487 pounds; 8 wether lambs and 16 ewe lambs, which weigh 2,410 pounds: also 25 breeding ewes, weighing 4,085 pounds, and four yearling ewes that have been hurt by dogs that I did not weigh. I weighed my flock the 20th of February. I have sold 29 sheep for $472 since the 1st of September, 1862.

I have thus given these particulars to the best of my ability. I stand alone in my neighborhood; there are none others that pay any attention to select breeding.

Respectfully yours, WILLIAM SQUIRE.

No. 16.—I imported from England, April, 1852, three ewes and two lambs, and at the same time we purchased here such Leicesters and Southdowns as we could get. They and their descendants have always been bred to Cotswold rams. Since the above date have imported from England two more Cotswold rams.

Respectfully yours, GEO. RUDGE.

No. 23.—I have a few Southdowns, but I have not had them long enough to tell how they will do. I shear about 125 sheep annually. Last year my flock only averaged 5¾ pounds per head. They are becoming very popular in this vicinity. I have furnished the foundation for several flocks to my neighbors. Our country here is very level, and I find that the Cotswolds are much more healthy here than the Merinos were, and also make much better mutton. HARMAN H. BREDBECK.

LEICESTERS.

For history of Leicesters see pages 427 and 428 of Ohio Agricultural Report for 1862.

ASHLAND COUNTY.

	Name and post-office address of the owner of the flock.	Bucks.	Ewes.	Quality of sheep.	Who commenced the flock.	When and where parents were obtained.
1	Thos. Moores. Mohicanville.	3	40	⅞ Leicester..	....	
2	M. V. Eddy, Jeromesville ...	..	....	½ do ..	....	
	CLERMONT COUNTY.					
3	Wm. Ashton, Williamsburg.	1	24	⅞ Leicester..	....	
4	John Needham, Monterey....	1	25	½ Leicester..	....	
5	Alex. Davidson, "	1	27	do	....	
6	D. W. Marsh "	1	9	do	....	
7	John Burns, "	1	27	do	....	
8	James Shaw, Belfast........	4	96	⅞ do	....	

CUYAHOGA COUNTY.

	Name and post-office address of the owner of the flock.	Bucks.	Ewes.	Quality of sheep.	Who commenced the flock.	When and where parents were obtained.
9	Reiley Honey, Cleveland	2	30	Leicester		
	DELAWARE COUNTY.					
10	F. C. Vergon, Delaware	1	72	½ Leicester	1850, T. C. V	O. and England.
	DEFIANCE COUNTY.					
11	Richard Knight, Farmer	1	70	½ Leicester		
	ERIE COUNTY.					
12	Wm. Parish, Bloomfield	3	20	Leicester	1856, W. P	Fergot, Cleveland.
13	A. Ainslie, Castalia	5	100	do	A. A	1857, Canada.
	GREENE COUNTY.					
14	Thos. Townsley, Cedarville	1	25	Leicester	B. B. Browning	England.
15	W. & A. Cline, Alpha	1	11	do		
16	F. Lafong do	1	12	do		
17	G. Koogler, do	1	15	do		
18	Wm. Stull, do	1	14	do		
19	Geo Hazner, do	1	13	do		
20	D. Hawker, do	1	9	do		
21	F. Hawker, do	1	10	do		
22	A. Hawker, do	1	15	do		
23	A. Gerlaugh, Alpha	1	19	do	B. B. Browning	England.
24	J. Gerlaugh, do	1	25	do		
25	H. Warner, do	1	18	do		
26	M. Swigert, do	1	10	do		
27	S. Shank, do	1	11	do		
	HOLMES COUNTY.					
28	John Yoder, Berlin	1	20	Leicester		J. Stoneman, Cuyahoga county.
	HAMILTON COUNTY.					
29	P. Sheperd, La Guardsville	1	15	Leicester		
	LAKE COUNTY.					
30	C. W. Ensign, Madison		90	½ Leicester		
31	Wm. J. Sheldon do	1	18	½ do		
	LORAIN COUNTY.					
32	Jas. Johnson, Eaton	2	50	½ Leicester		
33	Mr. Robson, do	1	30	½ do		
34	Thos. Wilson, do	1	40	do		
	MAHONING COUNTY.					
35	Abram Kline, Canfield	2	30	Leicester	Mr. Sheldon	England.

MONROE COUNTY.

	Name and post-office address of the owner of the flock.	Bucks.	Ewes.	Quality of sheep.	Who commenced the flock.	When and where parents were obtained.
36	S. Patchin, Middlefield......	..	25	½ Leicester..	....	
	MEDINA COUNTY.					
37	Wm. Shaw, Montville.....	4	75	½ Leicester..	....	Lorain county.
	TRUMBULL COUNTY.					
38	Cyrus Norcutt, Johnstonville.	2	60	½ Leicester..	1850, C. N	1850, Johnston.
39	D. Sunbury, do	1	40	Leicester....	1860, D. S.......	1860, do
40	Herman Johnston, do	1	30	do	1860, H. J......	1860.
41	Geo. W. Root, do	1	30	½ do	1825, G. W. R..	1825, Johnston.
42	A. W. Bridges, do	..	....	½ do	1861, A. W. B...	1861, do
43	Alfred Young, Gustavus....	1	60	½ do	A. Y.............	O.
	WARREN COUNTY.					
44	Wm. Crosser, Butlerville...	2	38	Leicester....	W. C	Wm. Bird.
45	Michael Voth, do ...	..	75	½ do	....	Warren county.
46	A. Hutchinson, do ...	1	29	½ do	....	do do
47	Wm. Young, do ...	1	19	⅛ do	....	do do
48	Thos. Hicks, do ...	..	23	½ do	....	do do
49	M. W. Cordell, do ...	..	97	½ do	....	Clinton county.
50	B. Herrell, do ...	..	4	⅛ do	....	Warren county.
51	Jacob Harris, do ...	1	4	½ do	....	do do
52	J. W. Rice, do ...	1	17	½ do	....	do do
53	Wm. Trickey, do ...	..	14	⅛ do	....	do do
54	M. H. Henry, do ...	..	40	½ do	....	do do
55	J. Smith, do ...	..	16	do	....	do do
56	Mary Baughman, do ...	..	9	do	....	do do
	WASHINGTON COUNTY.					
57	M. Blake, Lower Salem	10	....	½ Leicester..	M. B., 1858	Washington co., O.
58	Thos. Shepherd, Point Harmar	5	....	½ do ..	T. S., 1856	

No. 2.—I have never kept the finest grades of sheep. I keep those that produce a heavy fleece, and those that produce the most mutton. The best grades for this, in my estimation, is the Southdowns and Leicester ewes, crossed to French Merino bucks; those make a beautiful sheep for fatting. I have wintered 150 head this winter, one-half I have kept in the dry, the rest were out; I have tested this to my satisfaction that sheep kept in the dry will take one-third less feed than those that run out; and the sheep kept in dry are a great deal the stoutest sheep, more particular such a winter as this has been. I give all my sheep grain; they wool enough better to pay for their food, besides this, when spring comes they are so much stouter that they summer better. The best mode of feeding

hay is in racks, so they can get their heads in; by this means they waste less than in any other way.

M. V. Eddy.

No. 18.—The first of my flock was the common sheep of the country, which I bought in the winter of 1844, and by always selecting the best ewes and using fine wooled bucks, but from no particular flock, except one from Seth Adams, of Perkins, in the fall of 1858, by which I got my flock up to a good grade of fine wool.

In the fall of 1857 I went to Canada and bought two Leicester bucks and three ewes. I have been crossing by Leicester bucks on fine ewes, trying to raise a flock of larger sheep, and not to get the wool too coarse. I have had half-blood weathers that weighed 237 pounds gross.

A. Ainslie.

No. 35.—My sheep average about seven pounds of wool; I can get as much for my wool as my neighbors can for Merino wool. I had eight head of ewes of Mr. Sheldon's imported stock, that raised last season sixteen lambs; for those lambs they awarded me the first premium. They also awarded me a premium on the ewes.

Abram Cline.

Note.—The flock of Mr. James Pittsford, of Granville, Licking county, were reported to me as being half blood Spanish Merinos, and so published in the Report of 1862. Mr. Pittsford assures me that his flock is thoroughbred Merino; and that there are no half blooded sheep in it. It has been suggested that the reporter to me may have intended to class Mr. Pittsford's flock as half Spanish and half Vermont Merino. However, until it is better established than at present generally conceded, that the Vermont sheep are a distinct race, the suggested classification is rather too finely drawn. Jno. H. Klippart.

SHEEP HUSBANDRY.

In describing the qualities of the fleece, on page 393 of Ohio Agricultural Report for 1862, reference was made on page 395 to the yolk, or an oily substance exuding from the skin of the sheep. One object designed by nature in furnishing this yolk appears to be to soften the scales on the exterior of the fiber. To this yolk the wool is indebted for much that makes it superior to hair, for it renders it softer, more pliable, and more readily worked than it otherwise would be. This yolk is plentifully supplied in young and well fed sheep, but in old and half starved sheep it is scarcely perceptible, and their fleeces partake as much of the character of hair as of wool. For the want of it the scales are not so soft and the fiber

not so pliable, and cloth made from such stock is harsh and tender; and science has failed thus far to discover an unction which can render that wool soft which has been left harsh by nature not supplying its own emollient.

The ancient Romans appear to have exhausted every known expedient to aid nature in producing a soft and delicate filament. They smeared it with fine oil moistened with wine; the fleece was combed while growing, that it might not become matted, and the sheep was washed several times a year. This lack of yolk in old and ill fed sheep is another reason why we would urge upon the farmer the necessity of keeping his sheep in good condition, and disposing of them before they become old. Those who have old and badly fed sheep should not complain because their neighbors, who have young and well fed animals, obtain a higher price for their wool, though it may be coarser than their own; for it will make softer and firmer cloth than finer wool from poorer and older sheep.

Though this yolk is essentially necessary to the production of good wool, yet no more is required than just sufficient to keep the fibers soft and pliable. Any quantity in excess of this is of no benefit to the wool, but is sometimes injurious. Some farmers feed for the purpose of exciting a large supply, thinking that by so doing they obtain what many may suppose a heavier fleece; but the quantity of wool is not increased by the increase of yolk, and the purchaser would certainly be unfit for his business if he did not make a proper allowance for all excess of grease and dirt, and it seems to be a poor speculation on the part of the farmer to feed his sheep with special reference to producing yolk. His fleece will hold from twenty-five to thirty per cent. excess of the proper quantity required in good healthy wool, which would amount to about two pounds, and this, in some cases, is produced in a week, and in order to have this two pounds of yolk at the time of shearing they will produce in the course of a year from fifty to one hundred pounds; and it is not unfrequently produced at the expense of the pulp, which is the source of the wool. When this is the case, the wool, though soft and pliable, will be weak and stunted in growth. Generally this excess of yolk is produced at the expense of mutton—the food of the sheep in place of building up the carcass and fatting it, is expended upon the yolk—the farmer frequently finds his endeavors to feed his sheep defeated. He has fed high, and is surprised that his sheep have not gained in weight. It is also produced at the expense of milk. Sheep which produce large supplies of yolk are always deficient in milk. Corn too liberally fed to sheep will produce this effect. It contains a great amount of oil, and in place of producing fat, as in some domestic animals, it too frequently produces oil in sheep. Wool having its origin

in the skin, will be affected by whatever affects that part. Too much dry food is apt to affect the skin of all animals unfavorably, and man is not excepted. While all succulents have a happy influence upon the coats both of the horse and cow, some of the sleekest coated horses are indebted to a small supply of potatoes daily, for the softness and brightness of their hair.

Corn and hay are dry food, and fed exclusively and liberally to sheep are apt to affect their skin unfavorably, and consequently their wool. It has frequently been noticed that sheep which have been fed liberally with corn, show a falling off in the build of the staple during its winter growth, and is sometimes as weak as though its feed had been deficient; the bottom of the staple is often yellow, and filled with a salvy substance, a sure sign of skin disease. This is noticed in wool when the sheep have been fed upon roots and hay, and scarcely ever is there an excessive supply of yolk from sheep so fed, but in a great many cases where sheep have rapidly improved on such feed, while those fed upon corn and hay have lost weight, which could only be accounted for from the fact that corn, containing a great amount of oil, produced yolk and not fat. A little corn, with roots and hay, no doubt would be good feed.

In this connection we would urge upon the farmer the importance of looking well to his sheep in the fall. They are too often suffered to run too late in the pastures after the feed has been seriously impaired by the frost, and consequently lose condition. The growth of the wool is affected, a weak place is produced in the staple at this time, and any animal suffered to lose condition at this season of the year, cannot afterwards be restored when the weather is much colder, only at a greatly increased outlay. A little feed sometimes judiciously supplied before folding time, might be of more benefit than high feeding after they are housed.

The farmer never ought to keep black or grey wooled sheep. Their fleeces are never so valuable as white ones, for they are restricted in their use. They cannot be used for any other color than black, and that is never so lively as black from white wool. A very slight mixture of black fibers is a serious injury to worsted wool. Never keep or buy sheep with black legs or black faces, except Southdowns, for mutton, for if when young you cannot find black fibres in the fleece, they will come in as the sheep grows older, and materially affect its value.

The value of worsted goods depending to a great extent upon the brightness of the colors, the clearness of the whites, or the lustre of the blacks, whatever prevents the obtaining these desirable objects depreciates the value of the wool in which it is found; consequently unwashed wool if not disposed of soon after being sheared, so that it can be scoured before sweat-

ing, will be so stained by the yolk that a pure white cannot be obtained, and the tendency will be to dull whatever color is imparted to it. In addition to worsted goods known as Mouslin DeLaines and Lastings, there are a large variety made with cotton warps, silk warps, and cotton with silk and satin stripes; also all-wool Merinos and Thibets, none of which are made in this country. The dry goods report published in the New York *Independent*, August 20th, says: "British dress goods, plain colors, DeLaines, Alpacas, Coburgs, etc., have been sold in large quantities. Fancy dress desirable novelties have also sold well. Saxony dress goods are also very active. High colored fancies are in great demand. French worsteds of Fall style, plain DeLaines and Merinos are in much demand." And all this demand must be supplied from a foreign market, while nothing stands so much in the way of their being produced here as the want of the right kind of stock. And in no country in the world is this class of goods better adapted to the wants of the people than in this. There is nothing surpasses all worsted or worsted and cotton goods for gentlemen's Summer wear, for they are as light as cotton or linen, and when their durability is considered they are as cheap; and when compared with woolen goods their lightness, cheapness, and durability would, if produced in sufficient quantities, take their place to a great extent in the Summer season. While the variety and richness of colors which can be imparted to worsteds, and their warmth when compared with cottons, render them very desirable goods for ladies' and children's Winter clothing, and what renders them more particularly desirable for children is the fact that they can scarcely be made to take fire.

It is not because the right kind of wool cannot be produced in this country that we are indebted to the foreign manufacturer for these goods. There is a sufficient variety of wool produced in this country to produce all the varied kinds of worsted goods produced in the world. We lack nothing but quantity; and we have this advantage over every other country in the world: ours is the only one that can boast such a varied production. England can produce no such wool as the Merino of Vermont, Michigan, Ohio, New York and other States, while Saxony can be produced with care, equal to the finest Silesia. During the present Summer, Germany has yielded to Vermont the palm for producing Merino. George Campbell, Esq., of Vermont, exhibited twelve sheep at the exhibition of all nations at Hamburg, and obtained three prizes—first prize for the largest quantity of wool, second prize for the longest staple, and third prize for quantity and quality combined. And Mr. N. L. Chaffee, of Ashtabula county, exhibited at the State agricultural fair in Cleveland in 1863, a Shropshire Down buck which obtained a prize. This we should suppose would forever set

at rest the question whether the country is adapted to raising wool or sheep equal to England or the continent of Europe.

All classes of wool adapted to the production of worsteds, are equally adapted to the production of all open napless woolens, and the endless variety of coatings and fancy cassimeres, which are at the present time in such great demand with a fair prospect of long continuing so, increase the farmer's prospect of a good and steady market for coarse and middle wools for many years to come, before the supply will be equal to the demand. And long wools can be felted and will produce a firm cloth, though the process is slower than with short wool, and the nap longer, on which account it makes more waste in shearing.

Instead of taking out the curl in wool intended for felted cloths, it is left in the fiber, the process of felting being an increase of the curl, which shrinks the cloth and locks the curls and serrations together. In making broadcloth, the felting is performed after the weaving, but there are some kinds of felted cloth made without either spinning or weaving. Napping the cloth is a process of combing after the cloth is made, which is performed by passing the cloth over a revolving cylinder, the surface of which is covered with teasles, and their little hooks lay hold of the fibres which are upon the surface of the cloth, and draw out the tip of the fibre, the roots being held fast by the points of the serrations, which, as before observed, are always directed to the tip. If the fiber is only held by the tip it is always drawn out and wasted; if it is weak it will break off, leaving its roots in the cloth, but another fiber must be drawn out to supply its place, and thus the cloth is robbed of stock, and tender wool renders the cloth also tender. Cloth being but an aggregate of fibers, if they are weak it will be weak also; consequently the farmer will understand that it is highly important that all kinds of wool have good strong staples. When the cloth is subjected to the action of the teasles it is moistened, and their continued action upon the exterior fibres lays them straight upon the surface, in the same manner as they grew upon the animal's back, and the hand passed over the surface the way the nap lays finds it soft and smooth, because that is the direction the scales point; passed the other way it has a rougher feeling, because it is drawn against the points of the serrations.

And now when we take into consideration that almost every man in the United States wears a broadcloth coat, and almost every lady a cloak of the same material, and that it is all imported, what a vast field of enterprise in this direction appears to be forced upon the manufacturer and farmer to supply this demand and keep at home that large amount of wealth which is annually sent out of the country! And when we consider the extent of

those regions of country where the land is almost, if not entirely unoccupied, and much of that which is improved is producing corn, for which they have scarcely any market, we wonder what has so long kept the farmer from directing his attention to sheep husbandry. For though the sparsity of population may not make it an object for him to raise mutton, yet there are sheep which would pay him well to produce wool, without regard to other considerations. The fine wool sheep would be best adapted to these sections, and the farmer may be assured that this class of wool will be wanted for the production of fine broadcloth.

The Hon. Freeman Walker, of Massachusetts, well known as the friend of the farmer, in writing on this subject, says: "I had hoped and expected after the cattle-disease had taken off so many of our herds, that some of them would have been replaced by sheep; and so indeed they were. But the experiment failed, as I think in a great measure from the quality of the sheep purchased. The flocks did not do well, and I think they were diseased sheep before they were bought; and although in one or more cases they had the best of attention from an old Berkshire sheep-raiser, they did not thrive and were sold off, and I apprehend that this is one of the difficulties connected with the business—the getting of good healthy stock—and I would suggest the point to you as a matter of discussion."

It gives us pleasure to receive such suggestions, and to be made acquainted with failures as well as successes. For, if we were to investigate thoroughly all the causes that have led to our final success in any undertaking, we should, in all probability, find that our own failures and the failures of others had more to do in bringing us to the sought for goal, and giving us a thorough knowledge of the subject, than either our own or our friends' success. Adverse circumstances are looked upon by many with dismay; but the real man never lets obstacles prevent him from obtaining his desired object. The greater the difficulties overcome, the stronger the man, and more valuable his experience. And those farmers who have failed in their first attempts at sheep husbandry, ought not to be discouraged because their first trial has not been a success—but try again, with the full assurance that a rich reward awaits their final triumph. We are satisfied that there are dealers in sheep who are in the habit of going into some sheep-raising sections and purchasing old, ill-fed, and sickly sheep, and disposing of them at a low price, although at a good profit to themselves, to those farmers who desire to purchase at a low price, not caring much about the character of the sheep if they could only obtain them *cheap*. We do not say that this is the case with those alluded to by Mr. Walker, for the class of men we have referred to have no compunc-

tions of conscience about selling this class of sheep for first-class stock, and taking a first-class price, relying upon the inexperience of the purchaser for their success in the bargain. Yet we are compelled to reiterate a fact already alluded to, that the farmer as a general thing has been less careful with regard to the selection of his sheep than to any other of his live stock.

We quote a case in point from the Country Gentleman of May 28th, an article entitled "History of Wool-Growing in Wisconsin." The writer gives a good description of the first attempts by some farmers to raise wool in that State. He says: "Great demands generally sooner or later find a corresponding supply. This was not an exception to the rule. About 1850 to 1855, large flocks of sheep were driven into this State 'from the east' to supply this great demand—*selected sheep*, picked from many flocks 'in the east,' *selected for the lowest price possible.* Most of the farmers were no judges of the age or condition of the sheep. The farmers were to have the sheep on condition that the dealer should have two pounds of wool per head per year, and at the expiration of three or five years he was to have returned the same number of good healthy sheep. The farmer drives home his sheep, marks them and turns them upon Uncle Sam's pasture to feed upon the wild grasses of the prairie, and with scarcely any accommodations to winter them. In December the lambs begin to make their appearance only to perish. Some of the sheep die of old age before midwinter, others die for want of care, so that when spring comes round, no lambs are secured, and many of the sheep have died. The yield of wool is small. The second year goes round, and there is little more wool than will pay the rest. The third year the sheep are more than half lost or dead, and wool-growing is a miserable business and will never pay in Wisconsin. When the time to return the sheep comes, probably he has not half enough to return—curses the business and would go as far as John Randolph of Roanoke, to kick a sheep. In consequence of investing in such sheep, so unwisely and prematurely, there was a great decrease of the number of sheep in this State from 1857 to 1860. The great difficulty, in my opinion, in the way of making wool-growing a success, has been, the minds of the farmers have been so fickle respecting sheep; the sheep has been at times the most petted and best cared for thing on the farm, and at times the worst abused. Farmers have pursued no such course respecting any other product.

"If they have a poor crop of wheat, they do not abandon wheat, but sow more next year; and if the price is low, many hold on to a large crop of wheat, at great expense and trouble, as well as risk to the quality; still keep sowing more wheat, wheat after wheat, year after year. I can

show fields on which for twelve and sixteen consecutive years wheat has been sown, and never anything else. But let the price of wool be low, or poor luck (as it is termed) with the lambs a single year, they cut their tails off close up to their ears, and curse sheep, showing very little grace of patience, or still less reason. But some sheep have been spared in the hands of persons who appreciate their value, not only for the fleece and carcass, but as a means of invigorating some of the lands referred to, for it has been ascertained that taking fifteen or twenty crops of wheat in succession, burning all the straw and using no manure, makes even our prairie land less productive."

The cause of sheep dying when removed from one section to another is not always on account of old age, disease, or being ill fed, but the result of change; for, though nomadic in their nature, and frequent change of pasture having a very good effect upon them, when judiciously managed, yet when the change of diet or climate is an extreme one we must expect to find disease engendered in the healthiest of sheep. And these changes have a very deleterious effect upon the wool. Coarse wild grasses produce coarse, harsh wool; no good wool is raised upon the wild grasses of the prairie. Sheep changed from pastures abounding in the sweet grasses adapted to sheep to those where nothing but wild grass grows will require much care, and many will not survive the change, and those which survive will degenerate. But persevere. The wild grasses will disappear, the right kind of feed will come in, and one or two good bucks introduced to your flock will bring it up again.

Sheep changed from dry upland pastures to low, moist, luxuriant pastures are very likely to suffer, and great care must be taken or foot-rot will be the result. And one thing must be borne in mind, that the English long-wooled sheep or the Spanish long-wooled sheep require more care than the short-wooled of the same countries. Yet the short and coarse wooled sheep of England which run in almost a wild state, frequently suffer when brought from their mountain ranges to the cultivated pastures of the lowlands. This is done in the Fall for the purpose of fattening them for the butcher; and too often rot is the result. One of the best writers on this subject says: "The constitutional qualities of sheep will not accommodate themselves to the soil or climate of a country differing much in pasturage or temperature from that on which it has been raised, without time, great care, skill, and attention. *Labor omnia vincit.*"

Sheep love change of pasture, and certain breeds are such ramblers in quest of food that it was once thought absolutely necessary to change them, not only from one pasture to another, but from one region to another. The Germans are in some sections continually changing pasture ground, and

claim by so doing they improve the quality of the wool. The English and Scotch shepherds who tend the coarse short-wooled breeds are continually changing their localities, and as climate and herbage are much the same, with beneficial rather than prejudicial results. In Spain, while the long-wooled sheep are kept in the cultivated pastures, the shorter wooled subsist on the mountains, the elevated plains and downs. These are the migratory sheep; and the term Merino, though of doubtful origin, is applied by the Spaniards to denote sheep moving from pasture to pasture. These migratory sheep are moved from south to north in the spring, and are sheared on the journey; they return in the fall. The number of shepherds that attend these large migratory flocks are said to be 50,000, assisted by about 30,000 dogs. Professor Low says: "A prodigious mortality accordingly takes place, and more than half the lambs are voluntarily killed, in order that the others may be brought to maturity. That these extensive migrations are necessary to preserve the fineness of the wool is conceived to be an error. In Spain there are stationary flocks whose wool is as fine as the migratory; and in other countries where the sheep are never moved off the farms that produce them, wool is produced superior to the migratory flocks of Spain."

The long-wooled sheep do not ramble so much in quest of food as the shorter wooled. They are not so desirous of changing pastures, and do not require such high fences to keep them in bounds; and suffer more from sudden changes than the shorter wooled. We do not think it prudent to turn a large flock of sheep into a pasture abounding in wild, coarse grasses, with but little short, sweet herbage, which have been long kept in pastures producing the best and sweetest of grass, but would recommend the farmer to commence with a few carefully selected ewes or lambs from some flock owned by a person of known integrity, examining the skin of every animal by opening the wool, and selecting those only which have a fine delicate rosy hue. The skin of a healthy sheep is the best specimen of the real flesh colored tint so often talked about but rarely seen. As the character of the future flock depends upon the progeny of these ewes, select a vigorous three-year old buck, purchase him from a reliable man, be sure and know his pedigree the same as you would if you were going to raise horses or cattle for stock; do not buy one because it is cheap. If he is cross breed, do not purchase without a knowledge of the breeds crossed, let his appearance be what it may. Sheep, like other animals, breed back sometimes, and though one may have all the good points of one of the best breeds, yet he may have enough in his nature of the worst breeds to render his stock as inferior as he is superior. After making such selections, then save your lambs, the wild grasses in your pasture will disap-

pear before your increasing flock, the sweet grasses will come in and afford your increasing numbers sufficient food of the best kind. By carefully selecting and frequently changing your bucks, in a few years you will not only have a first class flock of sheep, but you will have one indigenous to your own farm, and obtained at less cost and risk than in any other way. Farmers are too careless about changing the character of the feed of the sheep in the fall and spring.

When the sheep are housed and subjected to dry feed, it has a tendency to produce costiveness, and this produces stretches, which often proves fatal, and always injures the wool by making it weak. This disease may be prevented by an occasional feed of apples, potatoes, or other roots. In the Spring, after the sheep have been kept on dry feed all winter, and are turned out to young grass, such change frequently produces scours, which also might be prevented in a great measure by feeding roots a few weeks before turning out, if they have not been so fed all winter.

If they are allowed to run out late in the fall in the cold storms without any shelter, they will be very likely to have catarrh. And keeping them too close in ill ventilated stables will not only produce catarrh, but diseases of the lungs. It is a practice with some dealers, in addition to high feeding, to confine the sheep in ill ventilated stables for the purpose of producing yolk. This is called sweating, and it is sweating the life out of the sheep, and money out of the farmer's pocket who may purchase such stock; and though they may survive such a barbarous practice, and the fleece sheared may be of prodigious weight, let it be remembered that it is not wool, it is grease, and one thing we have noticed, that when such persons are boasting of the weight of their fleeces, and bringing certificates of proof, they seldom say it was unwashed wool. A gentleman once took one of these fleeces which weighed seventeen pounds, and scoured it; all the wool he got was four pounds, and that was not perfectly clean, the black gum still stuck to the ends of the staples. Such treatment as this will produce disease, and he who buys stock that has been thus treated may expect in place of heavy fleeces, diseased sheep. It is not a new invention. The Spaniards have now, and have had for many years, sweating houses, into which they crowd their sheep before shearing. It is bad enough to have as a necessity crowded and badly ventilated stables, and stock wintered in such places will be likely to have affections of the lungs, and their lambs may also be affected, and be the source of disease among the whole flock. But to purposely do this can only be characterized as barbarous. Merino sheep may bear this treatment with a degree of impunity, but the English long wooled sheep could not survive it.

With regard to the benefits of change of pasture, and obtaining a flock

of sheep after the manner described, we have just found an article from J. W. Simmonds, in the Stock Journal, entitled "Experience of a Practical Wool Grower," and as it is so applicable to our present subject, we quote the whole:

"On January 1st, 1860, I purchased and had driven to my barn, twenty fine-wooled old ewes, taken from one of the best flocks in the county, and paid for the same forty dollars. These twenty had been the good sheep in their day in a flock of eighty. My friends told me they would rejuvenate, as it were, upon my place. I had no sheep, no knowledge of sheep, no practice in tending them, and hence tried the advice of every one in managing them. A first rate, full-blooded Spanish Merino buck had been with these sheep. The first season lost two sheep, raised twelve good lambs, and 3½ pounds clean wool average per head from my sheep. Used one of the best bucks the Fall of 1860.

"Second season lost two more ewes, raised sixteen nice lambs, sheared upon an average four pounds per head. Fall of 1861, used an ordinary buck. Wintered fifteen of my old sheep and each raised a lamb. My old sheep had really recruited. Their fleeces increased yearly, and upon the third clipping season averaged 4½ pounds, yearlings and two year old, 6 pounds. Sold my lambs Fall of 1862, for a high price. My sheep came to the barn in November in a first rate condition, the old sheep looked three years younger than when I got them. Pleased with my success, I had learned something of sheep and the way to tend them. Bought ten more old sheep from the same flock. Used in November, 1862, a yearling buck of my own purchase, selected for his many good and promising qualities—a full-blooded Spanish Merino. His first fleece of thirteen months of age weighed sixteen pounds, *nice wool*. Spring of 1863, raised thirty very nice lambs. Those from my young sheep are second to none. The fourth clip of these old sheep and their offspring averaged 5 3-5 nice, clean white wool per head. Of these twenty-two two and three year old sheep averaged 8 pounds per head. My buck sheared 22½ pounds, one year's growth. Live weight before shearing, 153 pounds. Sold eight fat wethers just after shearing, whose average live weight was eighty-five pounds. Reckoned in last clip was the fleece of the first lamb of my buck, dropped from a small yearling cosset, Nov. 25th, 1862, which weighed 8½ pounds. I have now lambs after that buck, which sheep men have urged me to sell to them for ten dollars per head, and two year old ewes for double that sum. During this three years' experience I have satisfactorily learned that there is a profound science in sheep-raising and wool-growing. This science has both its theory and practice, which requires both study and careful observation. To young men entering upon the sheep business, I offer

the following practical observations:—Begin with a few common ewes, and improve by using the best bucks. Keep no more sheep than you can keep well the year round. Tend them carefully, thus losses other than by accident will be avoided."

And in addition we would say, do not run the risk of rejuvenating old ewes. It would not do to follow his example in this matter, and particularly with long-wooled sheep. They mature earlier than Merinos, and consequently decay earlier. Sometimes a poor stunted fruit tree is removed from an orchard and transplanted with success, a fine, vigorous tree being obtained; yet such a course could not be recommended for general practice because one sometimes succeeds. Neither expect to succeed with old ewes because one or two have met with success. Yet we know of many cases where improvement of feed has materially increased the weight of the fleece as well as the quality. We do not mean by this that the wool was finer, but it was much stronger and freer bottomed.

Sheep taken from over-stocked farms and placed upon well cultivated, good conditioned farms, health and age being in their favor, will be much improved; and two flocks changed, by simply passing from the pasture of one to that of the other, will sometimes affect both favorably. We would just call attention to the 22½ pounds of nice wool sheared from that buck. It does not say that it was clean, nice, washed wool. We do not think that this was purposely omitted. We think the article worthy of special attention, and recommend it to the careful consideration of all desiring to obtain flocks of sheep, subject to the limitation we have noted, with a hope that those who have tried and failed will try again, nor let one failure rob them of the reward of ultimate success.

Animals, just in proportion as they become subservient to man, become dependent upon him for care and protection. To none will this apply with more force than to the sheep. When in a state of complete domestication, it appears sometimes as stupid as it is harmless, and affords Buffon some justification for describing it as one of the most timid, imbecile, and contemptible of quadrupeds. When sheep have an extensive range of pasture, and are left to a considerable degree to depend upon themselves for food and protection, they exhibit more force of character. It is the tender care of domestication that renders the sheep imbecile. But when left to take care of themselves, a ram has been seen to attack and drive off a large and formidable dog, and even a bull has been knocked to the ground by a stroke received between his eyes as he was lowering his head to receive his adversary on his horns and toss him into the air. Such sheep show considerable sagacity in the selection of their food. Always avoiding low, marshy lands, they prefer the uplands, and in good weather they will be

found on the highest points; but when a storm approaches they turn their heads downward and seek shelter in the plains below, but always avoid the watery marsh. It is true there are breeds such as the Romney Marsh, and the old Lincolns, that are raised and fed upon marshes; but these are well drained and abound in the richest and best of grasses, unlike in every particular our meadows. The sheep is the most extensive feeder of all domesticated animals, selecting its food from a greater variety of plants.

It will be found best in the management of all domesticated animals to pay some regard to the habits of the wild animals from which they have their origin. These ought to be made the base of our operations, to be regulated according to the conditions imposed by domestication. Our Winter treatment of sheep ought to be regulated to some extent by a knowledge of the habits of the less domesticated animal. If under all ordinary circumstances the sheep avoids the meadow when its grass is green, it certainly will not choose it when it is dried, but eat it rather than perish.

We have met with a number of farmers who never feed with any thing else but meadow hay during the Winter; and we have heard more complaints from these men that sheep raising does not pay than from any others. They complain that their fleeces are light, and their wool does not bring so good a price as their neighbors'. They complain also that they lose their ewes, and have poor luck with their lambs. Their oldest ewes die because their teeth are not capable of masticating sufficient of such food to keep them alive, and they lose their lambs because meadow hay does not furnish sufficient nutriment for the lamb during the period of gestation, or not sufficient to produce milk to supply its early wants, and should such lambs survive they bring a poor price from the butcher, or furnish very poor stock.

In another portion of this article it is stated that the character of the feed materially affects the condition of the wool; and it has been stated in very positive terms that there never was a good or heavy fleece from meadow hay. It matters not how large the supply of that kind of food, the wool bears the characteristics of short feed, always dry, harsh, and often cotted at the bottom. Ewes brought from such places after being well wintered gain one and a half pound per fleece, and worth five cents per pound more after being properly cared for than when fed upon meadow hay. But connected with this there is generally another evil. The farmer who cannot afford better food than meadow hay, can seldom afford a warm stable—poor feed and cold stables being characteristics of bad farming. In order to elucidate this more clearly, we submit an account of some experiments performed by Lord Ducie and Mr. Lawes, with their results:

Lord Ducie had one hundred sheep placed in a shed, which ate twenty

pounds of Sweedish turnips per head each day; another hundred in the open air ate twenty-five pounds each, and at that rate for a certain period. The former animals weighed each thirty pounds more than the latter. In another experiment five sheep were fed in the open air between the 21st of November and the 1st of December. They consumed ninety pounds of food per day, the temperature being 44 degrees. At the end of this time they weighed two pounds less than when first exposed. In another, five sheep were placed under shelter and allowed to run at a temperature of 49 degrees. They consumed at first eighty-two pounds, then seventy pounds, and increased in weight twenty-three pounds.

Mr. Lawes took twenty wethers and placed them in four pens, on the 30th of November, 1860. They were fed upon meadow hay cut into chaff, for eight weeks, with a plentiful supply of water. At the end of this time they were weighed. Those in pen one had gained five pounds; in pen two they had lost ten pounds; in pen three they had lost seven pounds, and in pen four they gained eleven pounds—making a loss on the whole of one pound. The temperature is not given, but being in England, and in November, we are satisfied it would be much higher than in our Winters.

In another experiment of thirty-two weeks duration, from January 25th to September 6th, 1861, five sheep ate on an average 22¾ pounds of meadow hay per head per week, and gained 8¼ ounces per head per week. Bear in mind that this experiment was continued through the Summer, and not during one of our rigorous northern Winters. For though much has been said, written and done to economize heat in our manufacturing establishments and dwellings, yet it is equally important that heat should be economized in the bodies of our domesticated animals, in order that food, which is the fuel of the system, may be properly economized, and unless this is done in the case of the sheep we must expect very poor fleeces. Nature demands that the temperature of the body be kept at a certain point. From this there is but a slight variation, Winter or Summer, in the frigid or in the torrid zones. In Winter we complain of cold, not because our bodies are reduced in temperature, but because the heat is rapidly removed. In Summer we complain of heat, not because the temperature of the body is much higher, but because it is nearly equal to the surrounding atmosphere, and the heat generated in the system is not removed with sufficient rapidity. If the heat is allowed to escape too rapidly from the animal by keeping it in an atmosphere at too low a temperature, the deficiency must be supplied by a larger amount of food, or the fat which the animal obtained while roaming at large during Spring, Summer and Autumn, will be consumed in the system in the same manner as it is consumed in the lamp or stove,

the same amount of heat being evolved in the animal system by its combustion. This is the reason why Lord Ducie's sheep exposed to a temperature of 44 degrees ate more than those kept at a temperature of 49 degrees, and lost weight. Had the temperature ranged from 32 degrees to zero, and twenty degrees below, what would have been the result? The sheep and the fleece would have been seriously affected. The elements of that yolk which is intended to render the fibre soft and pliant, would have been burnt to produce heat, and this would leave the wool dry and harsh. This is technically called the combustion of the carbon and hydrogen, by combining with the oxygen of the atmosphere. When the supply of food or fuel—for in this case they become synonyms—is not sufficient, or when the food does not contain the requisite elements for combustion, then nature comes to the aid of the poor suffering animal, and increases the coat which it at first designed should prevent the rapid removal of heat, (it being a slow conductor) not by elongating the staple, but by bringing in around the roots of the staple short, fine fibers, which curling around the coarser hairs, felt to such a degree in some cases that when the fleece is removed it can scarcely be torn asunder, and is of but little value to the manufacturer. It will not do for worsteds and for woolens; it is scarcely as good as shoddy, that article being made chiefly from fine cloth, and not felted near so much as some of this kind of wool is upon the sheep's back.

Yet if the fleece does not reach so extreme a case as the one described, the staple will be rendered short and weak. The short fibres will grow at the bottom of the staple, checking its growth and producing what is termed moss-bottomed, and if required for worsteds greatly increasing the quantity of noils, thus seriously impairing its quality; or if used for woolens it will increase the quantity of waste. A young sheep's wool produced under such treatment is worse than old sheep's wool on good feed, and kept in a moderate temperature. And after such Winter treatment the Spring finds the sheep so reduced in condition that Spring, Summer and Autumn fail to flesh up, and a very few such Winters are sufficient to fit it a candidate for its mother earth.

Were our domestic animals in a state of nature, and had they been roaming at large over our hills and across our valleys, we should find them at certain seasons of the year preparing to migrate to more genial climes, where snows do not cover the surface of the earth for any length of time. And were we in a state of half civilization, we should then have our herds and flocks in a state of semi-domestication, subject to some extent to the controlling influence of man, and in a measure dependent upon his care, yet retaining sufficient of their wild nature to enable them along with their nomadic owners to wander from place to place in search of green

pastures and genial clime; on the approach of winter turning their faces south and moving with the receding sun, retiring from the regions of snow and keeping pace with the unfrozen herbage. And when the sun again ascended the heavens, and with his scorching rays wither the once luxuriant pasture, the shepherd would turn his flock to the north, there to find the sweet fresh grass and cooler breeze.

But a higher state of the civilization of man and the more complete domestication of the animal, has fixed the abode of both. The large and spacious barn, stored with well won hay, the well filled granery, and well stored corn house, with capacious stables and sheds, affording food, warmth and shelter during the inclement season, obviate the necessity of wandering in quest of food or milder climate. Yet these do not change the entire nature of either man or animal. The sheep still loves variety of food, and though the dried hay retains many of the characteristics of the grass, its juices are absent, and though corn and grain contain far more nutrition than either grass or hay, yet they are neither when fed alone or fed together, the kind of food best adapted to the wants of the sheep. That roots are of great importance in the winter treatment of sheep, the experiments of Mr. Lawes, to which we again refer, abundantly prove.

In one pen Mr. Lawes kept five sheep thirty-two weeks, as in the experiment alluded to on a preceding page. He fed to each sheep 6¾ pounds of beans and 17½ pounds of hay per week, and they increased one pound per head per week; seven and a half ounces more than when fed on meadow hay. In another pen of five sheep kept for the same length of time, each sheep eat seven pounds of barley and eighteen pounds of hay per week, and increased one pound and one-half ounce per head per week. In another pen each sheep eat three pounds ten and one-half ounces of beans, one pound six and one-half ounces of linseed oil, and eighteen and one-half pounds of hay per week, and increased one pound one and one-fourth ounce. This last experiment, be it observed, was performed on the most nutritious kind of food, beans standing at the head, and linseed oil containing all the elements of fat. Yet these produced a comparatively small increase in weight when compared with other food fed to sheep in other experiments. For the same gentleman found that sheep fed on oil cake and turnips increased on an average one pound and fourteen ounces per week; others fed on oats and turnips gained on an average two pounds and one-half ounce per week; while others fed on barley meal and mangel-wurzel, increased the same amount. Others fed on oil cake, clover hay and turnips increased three pounds two and one-fourth ounces per head per week; and others fed on oats straw and turnips gained one pound five and three fourths ounces per head per week, gain-

ing thirteen and one-fourth ounces more than those fed on meadow hay, and four and one-half ounces more than those fed on beans, linseed oil and hay. We attempt no explanation how, with the aid of turnips, oat straw should give a greater increase of weight than beans, oil and hay. We can only state that we have read of so many instances of sheep fed on nothing but turnips, and rapidly increasing in weight, that we feel confident there is no overstating the case in this matter. And in quoting this experiment we have our mind on the fact that there exists in the minds of many intelligent farmers great prejudice against roots, because it is said that they contain such a large amount of water, and such a small quantity of nutrition. But one thing should be borne in mind that there is more required in the animal economy than the bare elements of nutrition; and if we reject roots because of water, we ought also to reject grass, because it is open to the same objection. And when the question is introduced for discussion at our farmers' clubs, it never should be argued on the bare merits of nutrition; but which draws hardest upon the soil should be a consideration, and the healthy influence they have upon the animal should also be another. Neither should it be argued that either should be abandoned, to the exclusive culture of one or the other; but by alternating roots and corn, one would prepare the soil for the other. Roots requiring few of the elements required for the production of corn, during the season they were growing the disintegration and decomposition of the soil would be in process fitting it to support a crop of corn; in some cases requiring manure, yet much less where there is a rotation of crops than when one crop is raised upon the same soil for a succession of years. Corn would during its year of growth prepare the soil for a crop of roots, while as already shown, the feeding of both to the sheep would be attended with the happiest results. In view of the fact that sheep love variety, we would give them a variety of food. Some days clover hay, other days timothy hay, sometimes a little straw, and sometimes we would try to induce them to eat a little meadow hay; and along with these we would feed a little corn, a little barley, or a little oats. We would also feed a variety of roots, turnips, carrots, mangel-wurzel, and if it was not for the potato disease, we would sometimes try a few tubers. Sometimes we would try pumpkins, and sometimes a few windfall apples we should convert into mutton, lambs and wool, instead of cider, not forgetting a good supply of water and plenty of salt. By such a course of diet we believe we should have healthier sheep, more and better mutton, larger lambs, and superior wool, at a less cost than could be produced by confining the animal to a less varied diet.

But there is another essential element to the well being of the sheep,

and which plays a very important part in the animal as well as the vegetable kingdom. We refer to light. It is well known that the agency of light accelerates chemical changes and combinations. That without it carbon cannot be fixed in the plant, and while the vegetable kingdom is a system of chemical combination, the animal is one of assimilation and decomposition, which can only be performed with due regularity while under the influence of plenty of light, in proof of which we again quote from Lord Ducie. Five sheep kept in the dark, quiet and covered, nine days, ate thirty-five pounds per day and increased in weight eight pounds.

Another important point is exercise. It must be borne in mind that the heaviest and most domesticated of our sheep are ramblers when compared with cows or horses. And stables and yards constructed for their winter accommodation should be sufficiently large to allow them the free use of their limbs. And though those which come up in the fall almost ready for the butcher, may be quickly and cheaply fatted by putting them in stalls and not allowing exercise. Yet if confined in this manner for any length of time they become excessively fat, then feverish and their flesh diseased. Lord Ducie's experiment shows that five sheep not allowed any exercise for nine days consumed, first, sixty-four pounds of food per day, then fifty-eight, and increased in weight thirty pounds. Due regard should always be had to a due supply of pure air, with ventilation sufficient to remove all impurities. All proper changes in the animal system are produced by the oxygen of the atmosphere, which is limited in the purest atmosphere to about 21 per cent., and when reduced to 12 per cent. life cannot be sustained, while any serious reduction from the pure per centage loads the atmosphere with the elements of disease and death, so that all persons who feed on animal food are interested in the proper ventilation of the stables, whether that food is milk, butter, cheese, beef, or mutton. As healthy stock is most profitable to the farmer he is certainly interested in the subject of ventilation.

Mention has been made in a deprecatory manner of the practice of dealers and raisers of the fancy stock of Merinos crowding their sheep into badly ventilated stables, for the purpose of increasing the weight of the fleece. And we also denounce the practice of raisers and dealers of large mutton fancy stock, stall feeding their sheep in the fall for the purpose of inducing great weight. Sheep that have been so treated suddenly fall off when subjected to ordinary stock fare with plenty of exercise; and rams particularly, when turned among a flock of ewes after such treatment lose rapidly, and rarely regain the weight they lose, and as a general thing it is the rams that are thus treated, in order that when brought to the scale great weight will attract the buyer. But let the buyer learn to

judge his animal more from frame and firmness of muscle when he requires stock for breeding purposes, than from fat, leaving that part to the butcher. No animals suffer more from loss of condition than sheep; and when once fat they should always be slaughtered, and never again used for breeding purposes, neither male or female. We have shown the bad effects of cold upon the fleece, and we would now call attention to too warm quarters, for be it remembered that the sheep will bear a lower temperature than either the cow or the horse. Its fleece in winter is getting heavy, and as we have before observed its coat is a slow conductor of heat, and if the temperature is too high, nature will come to its assistance, and though it will not shorten the staple, it will thin it, producing a thin built bottom, the shorter fibres will be at the top rather than at the bottom, the staple will be weak, and, as a consequence, the fleece light. It has been noticed that after a remarkable open winter we hear more said about light fleeces than after a severly cold one; though we complain of much cotted wool after the latter kind of winters. Let the temperature of the inside of the stable be regulated in a measure by the temperature outside, in severe weather closing all but enough for ventilation, in mild weather throwing all open, and understand that nature furnishes the wool to clothe the sheep, and not man; and if he wishes to avail himselt of his coat to clothe himself let him study nature, and then assist and not thwart her designs, and he will gain all he desires. It will be found that to winter sheep well, the following points will be essentially requisite, namely: A variety of food, plenty of pure air, plenty of light, moderate temperature, and moderate exercise.

The Hon. O. C. Felton, a gentleman who has long been engaged in sheep husbandry, writes, under date of September 26th:

"I am not aware that the diseases of sheep are very numerous. The foot-rot, the scab and grub in the head prevail in some localities, but not to any great extent in this vicinity. I have suffered considerable loss in my flock from a disease which I cannot learn has prevailed to any extent in many other places, and which I can neither name nor account for. I will try to describe it.

"The first symptoms of the disease appear in the loss of strength, pendant ears, partially closed eyes, and colorless skin upon the lips and ears. The animal will be seen to linger behind when the flock is in motion, and frequently to stumble and fall. In later stages of the disease the whole of the skin becomes pallid, the animal weeps at the nose and eyes, in some cases the lips swell to twice or thrice their natural thickness, and tumors sometimes gather about the throat and jaws, which on being opened produce a substance resembling the white of an egg. The animal lingers in

some cases for three or four months, eats well, and never seems to lose its appetite until very near its death. On a post mortem examination we find no blood in the carcass or veins, no grub in the head, no appearance of disease in the vitals or other organs of the body, but sometimes a watery substance like that found in the tumors above described, between the skin and the flesh, chiefly upon the sides and belly. I have suffered severely from the prevalence of this disease in my own flock, and I send you these facts in the case, thinking that perhaps you may make such use of them as to elicit information in regard to its existence in other places, its prevention and cure."

It certainly is among the possibilities that this disease may be occasioned by laurel, the eating of which generally produces vomiting, but this is the effort nature makes to reject the poison. Whenever a much larger quantity of any kind of poison is taken into the stomach than is absolutely necessary to produce death, it generally acts as an emetic, and thus causes the whole to be ejected from the system, the excess of quantity becoming its own antidote. The leaves of high and low laurel, as also the leaves of other shrubs, contain prussic acid, which in a concentrated form is the most deadly poison known. Its modus operandi, according to Liebig, is to change the character of the iron of the blood, the object of the iron being to convey the oxygen which it receives in the lungs to every part of the animal system, and returning to bring to the lungs carbonic acid, which emanates from the decomposition of the worn-out tissues. Whatever substance is taken into the system that changes the character of the iron so that it ceases to absorb oxygen, deprives it of the vitalizing power, and if the poison be in a concentrated form, death must be the immediate result; if largely diluted, disease will probably precede death. Sometimes poison is administered in small quantities medicinally, and has a beneficial effect. Prussic acid is used to lessen the action of the heart, with the best of results, and at the same time increasing the appetite. But if this depressed action of the heart be continued for any length of time, disease must be the result. Prussic acid exists in the leaves of the laurel in a combined state, and has to be liberated in the stomach by fermentation, which, if taken in small quantities, and coming off slowly, may be taken into the system as slowly, without producing any nausea, and yet slowly produce death by slowly changing the character of the iron of the blood, which would lose its color and vitalization, just as fast as it lost its power to absorb oxygen, and would load the system with disease just in proportion as it failed to rid the system of carbonic acid. The fluid matter found in the tumors or under the skin, and discharged from the eyes and nose, might be the result of this change in the character of the blood, and ac-

count for the want of manifestation of disease in the vital organs. This is but theory, however, but may be easily tested by exterminating every bunch of high or low laurel in every pasture where sheep are kept. We should as soon think of turning dogs loose upon sheep as sheep loose upon laurel. Neither should we abate our suspicions of that alder swale. Poisonous grasses will be likely to prevail there, particularly if not well exposed to the sun. Noxious grasses will in all probability be found, and though the older sheep would avoid the place, younger ones might stray or be driven there, and as we have before said, the domesticated sheep do not manifest so much sagacity in the choice of food as wild ones.

We thought when we first saw Mr. Felton's description of the disease which had affected his flock, that it bore some resemblance to the rot. The cause of the rot may be stated in plain language to be high living. For a great many years a controversy has been maintained among scientific men whether certain insects found in the liver, and called the liver fluke, are the cause or the result of the disease. Without joining issue with any party, we simply state that they are always found in the liver, and the liver is always diseased when the sheep are affected with the rot. These parasites are found in diseased livers of almost all the herbivora, and sometimes in that of man. Diseased liver is commonly the result of high feeding with too little exercise and not sufficient atmospheric air. Poultry are frequently fatted so, and disease of the liver introduced, in order that it may be enlarged to gratify the vitiated taste of the epicure. To avoid affecting the liver, we cautioned sheep owners against too little exercise, too warm quarters, and too high feed, and beg of them to remember that liver diseases are hereditary both in man and animal.

Sheep fed upon dry upland pastures, or on well drained lowlands, are never affected by the rot. It prevails upon lowlands when the seasons have been wet and the soil retentive of moisture, with a temperature favorable to decomposition of vegetable matter.

Mr. Bakewell, the originator of the Leicester breed, used to flood his lands, or hire lands that had been flooded, and also lands notorious for producing rot, for the purpose of rapidly fattening his sheep, or as some have it, for inducing rot.

M. Hammond says: "It appears every year in Egypt after the falling of the Nile, and it follows and keeps pace with the subsidence of the waters. Desolation and death accompany it wherever it passes, and it annually destroys at least 160,000 sheep. As soon as the waters of the Nile subside, the pastures which were submerged are speedily covered by a tender rushy grass. The sheep are exceedingly fond of it, and they are permitted to feed on it all day long. In the course of a very little time

they begin to get fat, when, if possible, they are sold. Their flesh is then exceedingly delicate, but soon after this disease begins to appear and the mortality commences. The disease is more frequent and fatal when the sheep are first turned on the newly recovered pasture than when the ground becomes dried and the rushy grass harder. But if the sheep pasture in the midst of mud or on the borders of marshes and canals, rot attends every step. The rot does not occur in elevated countries where the sheep feed on dry aromatic herbage. The Bedouins sell all the sheep which they can before they quit the Nile, for then they are in high and prime condition, after which they lose not a moment in reassembling their flocks and driving them back to the desert."

The early stages of this fatal disease give no indications of the malady that lurks in the system. The first symptom, instead of indicating disease, has more the appearance of health, for it is the rapid accumulation of fat, which increases till the general health is fairly undermined, then the animal becomes listless and unwilling to move, leaves its companions, shakes its head, depresses its ears and sinks rapidly in flesh; its eye becomes dull and glassy, the wool loses its brightness and comes easily from the skin, the breath becomes fetid, the bowels variable, at one time loose, at another costive; the skin becomes yellow and sometimes spotted with black; the eyelids are swollen; the lips, gums and palate have a pale tint; emaciation at this point becomes rapid—fever is induced and death quickly follows.

The methods by which the disease in its early stages is ascertained, is, first by handling the sheep on the small of the back. If the flesh is loose and flabby, and when rubbed against the ribs it gives a crackling sound—if the small veins at the corners of the eyes are filled with yellow serum instead of blood, then the animal may be declared unsound.

A post-mortem examination reveals a shocking state of disease, and to which no other name could be so appropriately applied as that of rot. Every cavity is filled with a yellow serous fluid, the flesh is pale and appears as though it had been soaked in water; the kidneys are pale and flaccid, the lungs filled with tubercles, the heart enlarged and softened, bowels sometimes distended with water, sometimes grown together, and at other times filled with tubercles; the liver a complete mass of disease, one part hardened, another soft and ulcerated, the passage through which the bile flows filled with flukes. There is no doubt but this is the origin of the disease. We do not thus minutely describe this disease because we think it a cause of want of success in this country, but knowing what a dreadful scourge it has been in England—some farmers having lost hundreds of sheep in a few weeks—yet notwithstanding such a fatal disease,

and many others of a milder form, sheep husbandry is continually on the increase in that country. We do not think it necessary to direct attention to that system of stall-feeding which we have before noticed, and assure all that the result, if carried to any great extent, will be disease of the liver; the second stage will be rot. And if any have had their flocks affected by it on account of their sheep feeding on soft spongy lands, they may be assured that the great preventive is thorough draining. Others have no occasion to fear it if they keep their sheep on dry upland pastures. It is said that tainted flocks have recovered when sent to pasture on salt marshes. This must have been in the early stage of the disease, when the liver only was affected. Changing them when the first symptoms of the disease make their appearance to dry upland pastures, will generally be attended with the most favorable results. While a free use of salt in the early stages has been found highly beneficial, this is a remedy simple and cheap. Sir John Sinclair states that at Mr. Mosselman's farm at Chenoi, beyond the Wavre, he found that salt was used for sheep, and by allowing them to lick it the rot was completely cured. But this must have been in the early stage. Mr. King, of Bath, England, says he purchased seven or eight sheep, all giving indisputable proof of rot in its advanced stage. He intended them for dissection, but as he did not require all of them, and during the winter season only he could dissect, he kept some till summer. They were supplied with nutritious food, free from moisture, and protected from storms and changes of weather. The result was that without medicine two of these rotten sheep recovered, and when he killed them, although he found that the liver had undergone some change, still the animals would have lived on for years. But it would have been very unsafe to have bred from such stock. The progeny in all probability would have had unsound livers. No attempt ought to be made to effect a cure after the first stages.

Sheep pastured at a distance from the seashore ought always to have a plentiful supply of salt easy of access, which is an excellent preventive of this disease.

Foot rot, a disease entirely different from rot, yet like it, has been the subject of much controversy among scientific men, the question being whether it is contagious or not. We do not intend to enter the arena of debate—our object being to give the best and most reliable information we possess of the characteristics of the disease.

To properly understand the nature of the disease, we must have some knowledge of the structure of the foot, the arrangement of which is well adapted to the natural habits of the animal. The foot is divided into two toes. These are shod with hoofs, in many respects similar to the hoof of

the horse, consisting of two parts, the crust and sole. The crust covers the outside of the foot and extends inwards about half way between the toes towards the heel, the sole filling the space between the outer walls or crust, and the whole secreted from the vascular tissue underneath. The crust, like that of the horse, being harder and tougher than the sole, keeps up a sharp edge on the outer margin, and is intended to resist the wear and tear to which the foot is exposed. It is well adapted to the mountain ranges which are the abodes of sheep in their natural state. Dry, hard soil, or bounding from rock to rock, wear down the edges of the crust, and keep up that sharp edge. But when it is brought into pastures where the soil is soft and moist, and the pastures luxurious so as to require little travel in quest of food, the wear of the hoof is very trifling, the outer edge so increases, and in some cases so overlaps the sole that inflammation is produced by its pressing against the sole, which nature designed it should protect. Ulceration is the result. Sometimes this crust is rent or broken off when overgrown, laying bare the vascular part of the foot, allowing sand and dirt to reach those tender parts. Inflammation first ensues, then suppuration takes place, ulcers are formed, and if allowed to go on unchecked, fungus granulations are thrown out; soon the hoof falls of. This stage of the disease is attended with high inflammatory fever, the animal rapidly loses flesh, and if not quickly delivered dies of fever and starvation.

When the sheep first manifests lameness, the hoof should be paired off so as to expose the whole of the diseased part. Sometimes it is necessary to lance the affected part, particularly when it commences under the sole. After pressing out as much as possible of the corruption, then wash the foot with a solution of some caustic; blue vitrol and vinegar is very good; muriate of antimony is considered best. In case of fungus granulations, the blue vitrol might be sprinkled upon them in form of a powder, or lunar caustic might be applied; but in any case the foot should be kept clean by constant washing, which, if regularly performed, will soon effect a cure.

The fact that a single sheep out of a flock is rarely affected alone, has given rise to the supposition that it is contagious. Yet we think it is without sufficient evidence, for when a flock runs in the same pasture it would be strange if the hoof of more than one did not become so enlarged as to produce lameness. And should any have the quick of the foot exposed by the hoof being torn, and be brought in contact with the virus from one already diseased, it certainly would produce ulceration as would any other virus; or a number might be affected from the same cause, without contagion or inoculation. Several French veterinarians made numerous attempts

to affect sound, healthy feet, but failed. They could only succeed by inoculation, which does not prove the disease infectious. When diseased hoof was rubbed against the hoof of sound feet it had no effect, neither had the virus when the skin was not broke.

Mr. Black, farm overseer to the Duke of Buccleuch, says that he had one hundred and sixty black faced sheep, the greater part of which were affected with foot rot, and many of them crawling about upon their knees. He turned them upon a dryer pasture, upon which were one hundred and forty Leicester and Cheviot sheep. All the diseased sheep except four recovered, and not one of the Leicesters or Cheviots were infected. This does not appear much like a disease which is contagious.

But as prevention is at all times much better than cure, and more easily accomplished when the nature of the causes of the disease are well understood, and having explained these as well as we are able, we will now give a few hints about the prevention. When sheep are allowed to run in pastures which will not wear down the hoof, but allow it to overgrow, the shepherd should house his sheep occasionally, and examine their feet, and with a sharp knife pare off all the loose, jaggy hoof down even with the sole, and be sure and pare all smooth between the toes if any turn in.

The hoof will not be likely to wear down very fast during the winter when the sheep are housed, and ought to be carefully examined in the spring before turned out, and carefully pared if at all enlarged. And by examining them a few times during the summer and autumn, should the sheep run in a soft, moist pasture, keeping the hoof pared down to its natural condition, foot rot will never be known in a flock so cared for.

A recent writer says: "A pasture in which a large flock of sheep were constantly kept, besides a number of the Black Heath breed, that were brought down from the moors the fore part of autumn to be fatted. These were in the care of an old shepherd whom we used to assist in driving up the sheep, and from him learnt many useful lessons respecting their care. These lessons were the result of many years tried experience, and he often assured us, and so did his neighbors, that he never had a case of foot rot, and during the time of our acquaintance with him we never knew one in his flocks; while we have frequently seen his careless neighbor's sheep feeding on their knees unable to stand upon their feet, and sometimes we have found them so neglected that they were not only ulcerated but fly blown."

A writer of considerable experience with sheep says that he had pastures which before they came into his possession, had gained a reputation for infecting sheep with the foot rot; but after twelve years experience

with sheep upon these lands, he had not had a single case. The only preventive practiced was the paring down the hoof when it became enlarged.

We have frequently alluded to the fact that the character of wool was materially affected by the character of the feed, the climate and temperature in which the sheep are kept. We have said that sheep on being changed from one pasture to another, have their fleeces affected for better or for worse, just in proportion as the pastures are good or bad. It has long been known that sheep raised and kept in chalky districts have coarse, short, harsh wool, while those fed on rich, loamy soils have longer wool, which is soft and silky; and divide a flock which has had a run of a rich loamy soil, one-half being allowed to remain upon that pasture, and the other removed to a chalky district, or to a pasture abounding in weeds and coarse wild grasses, the former half would remain soft and silky, the latter would become coarse and harsh. Reverse the change and you reverse the result. It is also well known that the ardent suns of one climate produce harsh wools compared with that produced under milder suns of more temperate climes. The Merino wool of Spain is not so soft and mellow as that from the Merino of Saxony. While the Merino wool of California and Mexico is wild and harsh compared with that of Vermont and Ohio.

In compliance with a request from a highly esteemed friend, we shall endeavor to show the causes which produce these various changes in the character of the wool of the same breeds of sheep. In order to do this, and at the same time lay the matter before the public in such a manner as to be properly understood, we must bring to our aid both vegetable and animal physiology.

We must bear in mind that all those substances which constitute the animal kingdom are produced in the vegetable kingdom, from elements found in the soil, the air and water. The animal dissolves those vegetable substances in its stomach, they then pass to the blood, and as it circulates through the arteries it assimilates them to its system; afterwards it decomposes and resolves them back to their primitive elements, which again become food for vegetation. The constituent parts of wool are the same as that of horn, hoof, and hair; and all those component parts are found in the body of the animal. They consist of protein, gelatin, oil, sulphur, iron, silica, manganese, carbonate and phosphate of lime, soda, and potassa. The last eight are generally described as earthy matter. Protein, a word derived from the Greek, which signifies "I take first rank," and so it does in the blood. It is a semi-transparent substance obtained from albumen and fibrin, and is considered the basis of animal tissue, and of substance of vegetable origin. Gelatin is what constitutes the tendons of animals. The oil is fatty matter, and is the same as the oily part of the yolk so many times referred to.

The constituents of wool are very similar to bone; but in bones the earthy matter greatly prevails, while in wool and the horn of the sheep, protein, gelatin, and oil greatly predominate; while these latter substances combined with larger quantities of earthy matter, are found in less quantities in the antlers of the deer than in the horn of the sheep, consequently the horn of the deer is harder and not so easily worked as the more elastic horn of the sheep.

Bones are soft and yielding like cartilage when gelatin prevails, but hard and brittle when earthy matter is in excess. In the bones of young animals gelatin exists in much larger quantities than in older ones, and their bones are soft and pliable in comparison with the bones of other animals, which are hard and brittle on account of containing more earthy matter.

We have said that the animal cannot change the character of those substances which it receives from the vegetable kingdom; so the character of its body must depend in a great measure upon the character of its feed. That part which constitutes the muscle and tendon of the animal is formed in the vegetable, and exists there as fibrin and albumen, in both of which protein is found. Fat is not organic matter, that is, it does not constitute any of the organs of the animal; while those substances which in a great measure constitute it, undergo a slight change. It is produced from starch, gum, and sugar. These are frequently termed elements of respiration, or heat producing substances. When more of these are taken into the system than are sufficient to keep up the heat of the body at a proper temperature, the excess undergoes a slight change, and is then laid away in the form of fat in the cells of the tissues, there to remain till a sufficient amount of heat producing substances cannot be obtained, then the animal draws upon its store of fat, which is consumed, and the animal becomes poor. The hog, which is always fed upon heat or fat producing elements, is almost suffocated with fat, while its bones and muscles are so small that they can scarcely bear its weight. While the dog, fed upon raw beef, which is animal fibrin, has large muscles and but little fat. If we reverse this order of things and give the hog the raw beef, we shall have little fat but large muscle in its carcass. If we give the dog heat and fat producing elements we shall have on its carcass much fat but little bone and muscle.

Animals which are fed upon grasses that contain a large amount of albumen and fibrin, their blood will contain a large amount of protein, and their muscles will be largely developed; and if the same grasses contain a large amount of starch, sugar, and gum, we shall also have a large amount of fat. If the muscle producing substances are deficient, we shall have small muscle, and if earthy matter, particularly lime, is also small, we shall have small weak bones. If the earthy matter along with muscular matter,

be large, with a small proportion of fat producing element, we shall have a large boned, muscular animal. It thus plainly appears that not only the organic, but also the inorganic parts of the animal are dependent in a great measure for their character upon the character of the vegetable substances upon which they feed. And it can also be made as plainly to appear that the grasses upon which animals feed are dependent in as large a measure upon the character of the soil upon which they grow for their character, as the animals are upon the grasses. And consequently the character ef the soil upon which the sheep feeds will modify in a great measure the character of all its organs; and though its wool would not be considered an organic substance, but rather an excrescence, yet we see that it contains all the elements of the organic and inorganic parts of the body, and as they are modified by the character of the feed of the animal, so also will the wool be changed in character by the character of the soil of the pasture upon which the sheep feeds.

Another important point for consideration in connection with this subject, is the analysis of the earthy matter, which we have noticed in the analysis of the grasses. This earthy matter is composed of a variety of substances, not less than eleven; but as only three of these seriously affect the character of the wool, we shall only direct attention to these, viz: lime, potash and silica. It is the first that gives character to calcareous soil. And as we have already noticed that the bones of animals are hard or soft in proportion to the amount of lime they contain, and that on account of the horns of the deer possessing more earthy matter than the horns of the sheep, they are harder. So wool is harsh in proportion to the amount of lime and potash it contains more than is necessary to give due solidity to the fibre. Wool of this kind, it will be noticed, has a dry, dull appearance, and never receives a bright, lively finish. While wool which contains a less amount of lime, with a larger amount of silica, is denoted as bright haired or luster wool. This wool is susceptible of a high finish.

If we examine Sweet Scented Vernal by the table of analysis, we shall find that it possesses 1.24 per cent. of earthy matter. Of this, 28.36 per cent. was silica, 9.24 per cent. was lime, and 32.03 per cent. was potash. This would give, combined with fatty matter, sufficient to neutralize the lime and potash, and protein and gelatin sufficient to soften the silica, a nice, lively wool, for the amount of earthy matter contained in the 100 parts of grass we see is small, so the amount of lime must be very small. But another reference to the table of the analysis of grass gives but 67 per cent. of fatty matter, and flesh producing substance 2.05 per cent., consequently we could not have very soft wool. Orchard grass, we find by the table to

contain 1.59 per cent. of earthy matter. This yields 26.65 per cent. of silica, 5.82 per cent. of lime, 29.52 per cent. of potash, while the table gives 94 per cent. of fatty matter, and 4.06 per cent. of flesh producing substance. It is quite evident that there must be a striking difference between animals of the same breed fed on Sweet Scented Vernal, and those fed upon orchard grass The former containing in the first place nearly as much earthy matter as the latter, and nearly double the quantity of lime, while the latter contains about one-third more fatty matter, and nearly double the amount of flesh producing substance. The wool being very susceptible to the kind of food the sheep receives must be very seriously affected by either of these grasses, if fed alone. As something cannot be produced from nothing, Sweet Scented Vernal must produce a very harsh wool, when compared with that produced by orchard grass, which would be soft and mellow.

We find that white clover contains 2.08 per cent. of earthy matter, and this yields only 3.68 per cent. of silica, 26.41 per cent. of lime, and 14.33 per cent. of potash. The analysis of the grass gives 89 per cent. of fatty matter, and 3.80 per cent. of flesh producing substance. From this it appears that white clover would give harsh wool if fed alone—and so it does. White clover's element is a soil abundant in lime. It yields sweet mutton, but harsh wool, except counteracted by some other grass rich in the other elements, but deficient in lime.

Another reference to the table shows us that Timothy yields 2.26 per cent. of earthy matter, and this contains 31.09 per cent. of silica, 14.94 per cent. of lime, and 24.25 per cent. of potash; and the table of analysis gives 1.50 per cent. of fatty matter, and 4.80 per cent. of flesh producing elements. From this it will appear that timothy will give us a much softer wool than white clover. We have already noticed the fact that grasses are materially affected by the soil upon which they grow, but also notice that the composition of grass changes materially by age, so the wool will be effected by the same kind of grass, fed at different ages.

In view of the difference in the constitution of plants, on the different soils on which they grow, and of the marked difference in their composition at different ages and times of the season, the necessity of a variety of feed will be forced upon us to meet the varied wants of the sheep.

We come now to the consideration of one or two other points which we have noticed in other articles. We have stated that ewes have always weak wool, and it is not possible for it to be otherwise, for during the period of gestation the protein and gelatin is required to form the future lamb; and when she is in milk, flesh producing substances, fatty matter, and heat producing substances are all heavily drawn upon, and if the lamb

is dropped very early in the season except the ewe receives a large supply of food abounding in heat producing elements, the fleece will be seriously cotted as well as weak. But the lamb requiring but a small amount of earthy matter compared with the other materials which it draws upon, the wool will be as harsh as though fed upon soil producing the largest amount of lime.

Old age produces harsh, weak wool, because mastication is deficient, and fails to produce the best elements for the wool, and the system being well loaded with earthy matter, the greater part it receives goes to the wool. Sickness must produce weak wool, for then the material for supplying it with growth is cut off, and wool suffers same as anything else when the supplies are stopped.

We learn in this connection why meadow hay produces such results. For those sedges to which we have already referred, contain little nutritive, oil producing, or heat producing elements, yet abounding in lime. Hence we do not wonder at harsh, cotted, light wool, as the result of such feed; nor are we surprised that more nutritious food should give heavier and better fleeces. It will be remembered that we noticed previously that a sheep after being fed one winter on meadow hay, and the following winter on good feed, its fleece gained one and a half pounds, and was worth five cents a pound more, we now understand the reason why. Some farmers make a boast that they can keep a few sheep through the winter without any additional expense, because the sheep can be fed on what the horses and cattle leave in their racks. Now we have no objections to raise against this as a matter of economy, but we are of the opinion that the leavings of the horse or cattle is not very good, or they would not leave it; and the sheep fed on nothing else would suffer seriously, and as a matter of profit we would recommend a few more sheep kept than sufficient for such purpose, and these supplied with a little of the best of food. When we consider that roots contain from ten to twenty per cent. of heat producing substances and fatty matter, we can readily understand why roots fed along with meadow hay would save the fleece from being cotted, though they could not save it from being harsh; and if a little oil cake was added to the feed, which contains about twenty-six per cent. of flesh producing substance, or any other flesh producing substance which would supply the wool with protein or gelatin, while its oily matter would furnish oil sufficient for the wool, but not, perhaps, to neutralize all the lime, if it did it would produce a soft and mellow wool. While an examination of the table of analysis shows us what a difference would be found in two flocks of sheep, one fed upon the best grasses, and another upon the worst, and a like difference would be found in all the other live stock, we think it will

also be easily understood in view of the facts presented how different soils affect the character of the wool.

We come next to the consideration of the effects produced upon wool by climate. We have already called attention to the effects that climate has upon the grasses, and then upon the wool. It is a well established fact, that all animals have thin, coarse coats that inhabit warm climates, and the sheep is not an exception. Its staple is thinner and coarser there than in more temperate climes, not requiring so thick a covering for protection. The Merino sheep in place of converting the heat producing substances and fatty matter into fat, as most animals do, converts them into oil, which is simply fat in a state of liquification, the component parts being nearly the same in both conditions. The oily part or yolk, however, does materially differ in the different kinds of Merino. One kind exudes a thick, sticky yolk, which contains a large amount of gum. Another yields a limpid yolk almost destitute of gum. When we examine the wool of the latter kind, raised in Mexico, California, or any other country situated in about the same latitude, we find the top of the staple dry and harsh, while the lower part is soft and oily. The sun liquifies the yolk to such a degree that it is easily washed off by the rains and dews. The ends of the staples are then left exposed to the fierce rays of the sun, which extract the fixed oil of the wool, which is also washed off, and another portion extracted, the moisture aiding the operation. If the wool is raised upon grass deficient in albuminous substances with a large supply of lime—which is frequently the case on wild uncultivated lands—then the top of the staple will be harsh indeed.

The gummy yolk produced by the former kind, is coagulated by the heat of the sun, and forms a black, elastic gum at the end of the staple, which being alike impervious to the rays of the sun and rain, protects the wool from both, and when the wool is properly cleansed, if that can be done without a liquor so strong of alkali as to act upon the fixed oil of the staple, we shall have a comparatively soft wool.

We have already on a previous page referred to corn as an oil producing food. It contains about eighty per cent. of fatty matter. This, if fed to sheep in large quantities, without an admixture of feed rich in albuminous properties, will give us an exceedingly oily wool. And as horn when heat is applied to it gives out a portion of its oil, leaving the horn dry and brittle, so this kind of wool when heat is applied, and particularly when aided by moisture, parts with its oil and is rendered harsh by the loss, and particularly so when deficient in albuminous substances. Persons are frequently very much deceived by this class of wool; they are deceived by the first shrinkage; and this does not tell more than half the story. The first process in the course of manufacture to which wool

is submitted, is washing, either with soap or an alkaline liquor. In this process it commences to part not only with its external oil, but its oil of composition, and in drying its parts with another portion, and the wool reveals a harshness which could not be felt before, while its shrinkage is found to be very great, though it might have previously been washed upon the sheep's back. But this is not the only shrinkage. After weaving the cloth has to be washed and dried, and if woolen it has to be fulled and again washed and dried, then steamed and dried, and at every process parting with oil, alarming the manufacturer to find that it takes such a large amount of wool to produce such a small weight of cloth, and also to find that the cloth has a much harsher feeling than coarser wool raised upon food rich in albuminous substances. Farmers in the eastern States never ought to labor to produce such wool. It brings them into competition with wool raised upon wilder lands than theirs. The English farmer never tries to compete with the wool raised upon the moors, but raises upon his rich pastures wool as superior to that raised upon the moors as his lands excel in herbage the vegetation of the wild lands. Every person at all conversant with manufacturing, knows that old and ill fed sheep's wool grows harsher at every stage in the process of manufacturing, while young and well fed wool grows softer and softer. There are a few who are not acquainted with the softness and mellowness of the Saxony wool as compared with the more oily wool of the French and Spanish Merino. The Saxony wool is rich in albuminous substances and silica, with a sufficiency of oil to neutralize the alkalies and aid in softening the whole. It has not the oily, sticky feeling of the French or Spanish Merino, yet its fibres are more pliable and much stronger according to their size. In the process of manufacturing it is continually improving, and no wools make so firm a piece of cloth or present such a delicate softness to the touch.

The milder suns of Saxony have, no doubt, much to do with producing this difference: but the difference of the soil, and through the soil the feed has much more to do with producing this result. And while a large amount of wool raised in this country may be classed as oil made wool, yet we are happy to say there are large quantities that can be properly classed with the best of Saxony and English descriptions.

Many of the English combing wools are good specimens of that class of wool which improve by working. Rich in the best elements which produce wool, with not too much oil, the olive oil which is used in combing prevents the hot comb and moisture from extracting the fixed oil, while the heat and moisture aided by the olive oil which the wool absorbs, softens the fibres, and they are drawn out smaller by working, and receive a polish which those who never saw wool combed and smeared with olive oil would scarcely believe could ever be imparted to it, while fewer would

believe without making the subject a special study, that the wool was indebted to the soil for its property to receive such a lustre, which it retains through every process of manufacture; and though it may apparently be dulled in some of the stages, yet the lustre obtained in the final finish, is an assurance that the first labor was not in vain.

The washing of sheep before shearing is a subject of much controversy at the present time, the principal opponents of the practice being the owners of what is termed fancy stock, sheep which are noted for exceedingly heavy fleeces, and to produce which every effort which skill can suggest is made, not however to produce wool, but yolk. And were this class of sheep washed before shearing, they would lose much of their reputation for heavy fleeces, consequently they do all they can to prevent them from being wet by the slightest shower. There are others, however, who honestly believe that washing sheep is a prolific source of disease, and in order to prevent it are careful to shelter their sheep from rain storms; while others who are careful not to wash their sheep for fear of causing disease, are very careless about their exposure to rain, both in the Spring and Fall. We have heard it urged by many as a reason why they should not be subjected to a discount of 25 per cent., that their wool would not shrink so much, because their sheep were out in *that heavy rain storm which continued for about a week or so*, a fortnight *before they were sheared*. We saw during the cold rains of last November, a large number of sheep exposed to those storms without any place for shelter—their fleeces wet for near a week at a time. Now which is the most injurious to sheep, to be exposed to those long storms in Spring and Fall, when the temperature is low, or to wash them on a warm day in June when their fleeces would be dry in about thirty-six hours after the operation? Which would extract the most heat from the system, to have their fleeces wet on a dry hot day, when they would dry rapidly, or to be wet for a week at a time by a cold north-east storm? The farmers of England always wash their sheep, and their wool is always clean, and we never heard of any thing serious growing out of the practice, yet they would not dry near so rapidly there as they do here.

Wool not washed upon the fleece will shrink on an average, if long wool, 25 per cent.; if Merino, from 33 per cent. and upwards more than if washed. And it does appear to us very poor economy on the part of somebody to pay from one to six cents per pound for the transportation of dirt from the place of shearing the sheep to the place of manufacturing, in order to obtain the small amount of wool which it sometimes contains. But who pays for the transportation of the dirt? It would be very unfair for the purchaser and wearer of the cloth to pay for it; and it would be equally un-

fair for the manufacturer to bear the useless burden. That expense must be borne by the farmer. Washing the sheep would prevent this unnecessary outlay.

Some farmers who do not wash their sheep wash their wool after it is sheared. This is called tub washing, and is open to two very serious objections. One is, the farmer not being accustomed to scouring wool, frequently sets the grease into the wool instead of washing it out, a misfortune which not unfrequently befalls the most proficient. When this is done it is almost impossible to cleanse it properly, which if not done, prevents it from ever receiving a good color. The other is that the washing being performed before being sorted, the different qualities are so blended together that it is impossible ever to separate them properly. Not washing the sheep is a source of much misunderstanding between the farmer and the manufacturer—the farmer rarely understanding that wool is subject to so large a shrinkage before it is prepared for manufacturing. It is a rule with manufacturers to discount long coarse wool 25 per cent., and 33 per cent. for Merino when the sheep has not been washed, and this is no doubt the nearest approximation to the real shrinkage which can be reached.

We saw in connection with this subject a statement in the Boston Cultivator, made by a Mr. E. R. Andrews, of West Roxbury, that he had washed two unwashed fleeces from two of his Cotswold sheep. He says: "He soaked them in warm, soft soap-suds, washed them carefully and rinsed them in clean soft water, frequently changing the waters in the operation. The wool was then exposed to the sun for several days, when it was perfectly dry and white. The fleeces weighed twenty-one pounds before they were cleansed, and fifteen pounds afterwards. This gives a shrinkage of 28.58 per cent., little more than is generally discounted for this class of unwashed wool, while it generally shrinks 25 per cent. after being washed on the sheep, which in Mr. Andrews' experiment ought to have given 43.75 per cent. But a few questions arise in connection with this experiment. Did Mr. Andrews scour his wool clean, or did he set the grease? Did he make a fair average selection from his fleeces? Or were they from old ewes? If so, the shrink would be small, which the poorness of the wool would counter-balance. Or were they poorly fed sheep? If that was the case we should not expect a very heavy shrinkage. The average shrinkage of 25 per cent. is for average fed and for sheep of an average age. If the result of Mr. Andrews' experiment is a fair test of his flock, it would certainly be greatly in his favor to wash his sheep. But there is a lack of knowledge on the part of the public generally with regard to the shrinkage of wool after it has been washed upon the sheep. We find in the Wool Grower an article on this subject by correspondent "B." He says

"That the average of Ohio washed wools (washed on the sheep) is 35 per cent., while the aggregate production of other States will be in excess of their amount about 5 per cent.; that when the wool grower gets seventy cents per pound for his wool, he in fact gets one dollar and twelve cents for clean wool. The editor of that paper says: "We suppose our correspondent means to say that when the manufacturer buys unwashed wool at seventy cents, he really pays one dollar and twelve cents; and asks the question, if the farmer should properly clean his wool would the manufacturer pay him one dollar and twelve cents per pound? Correspondent "B," does not mean unwashed wool, but wool well washed upon the sheep. For there is not a manufacturer in the United States whose wool, if well washed upon the sheep, does not average a shrinkage of over 35 per cent. every year.

"We do not say he will not have lots that will not shrink less than that, yet we know he will have much that will shrink more. We know of scoured wool which was well washed upon the sheep, which shrunk 44 per cent.; some very clean light Cotswold and Leicester which shrunk 20 per cent. after being washed upon the sheep, and well taged; wool that was not washed upon the sheep, which shrunk 76.5 per cent. This was from fancy stock raised in Vermont. Is it correct to apply the term wool to such stock? If the less proportion is always contained in the greater, ought it not to be called grease? We know of scoured wool that shrunk 66 per cent.; but we have no recollection of unwashed wool that shrunk less than 40 per cent."

These things must be and are considered by those who buy wool; and notwithstanding the oft repeated assertion of some of those who do not wash their wool, that they obtain within five or ten cents per pound as much as their neighbor who does not half wash his wool, yet they do not obtain as much as their neighbor who washes his wool well, by 33 per cent. if their sheep are Merinos. The only way to settle this disputed point is for the farmers to wash their sheep well, and then they will have done paying a high price for the taansportation of dirt.

No class of sheep so clearly demonstrate the effects of good feed and careful breeding as the improved Southdown. The original breed having been raised from time immemorial upon a low range of chalky hills, running parallel with a part of the southern shore of England, the greater part being in the county of Sussex. These are called the Southdowns. They are about eighty miles in length, and from five to six miles in breadth—the highest point being about eight hundred and fifty feet above the level of the sea. The soil is light and sandy, the grass short, but very sweet.

The valleys among the Downs were once almost as barren as the hills

themselves, but by cultivation have been rendered exceedingly fertile, to effect which the sheep has rendered considerable aid, pastured upon the hills by day, and folded upon the arable lands by night, which it enriched with its manure, and received a recompense in artificial food raised for that purpose, such as rye, grass, tares, clover and rape; and in the Spring frequently turned upon the young rye; in the Winter they are fed with a good supply of turnips. Thus, while they have aided in changing the character of their feed, that feed has aided in changing their character and the character of their fleece.

When Mr. John Ellman, of Lewis, in the county of Sussex, England, commenced improving this breed, and who succeeded as well as any person ever succeeded in any undertaking, and who has transmitted the great secret of his success to all desirous of profiting by it, that success consisted in strictly obeying the laws of physiology.

The breed at the commencement of his labors is described as having light fore quarters, narrow chests, long necks, flat ribs and long limbs. The length of the staple was from one and a half to two inches; the fleece did not weigh over two pounds; the wool, though comparatively fine, was furzy, harsh and brittle, and was used for carding only, yet possessed but poor felting properties, and belonged strictly to the short wooled class of sheep. The wethers, which could not be fatted before they were from three to four years old, when fat weighed from fifteen to eighteen pounds per quarter. This description must not be received strictly as a matter of history, for such a class of sheep yet exists upon its native hills, owned by poor, shiftless farmers, who can not afford them better food than the unimproved hills afford, and whose consciences would not allow them to step out of that path their forefathers trod before them. Mr. Ellman, his compeers and successors, by paying strict attention to breeding, selecting those ewes for stock purposes which were furthest removed from the kind described, obtaining the best rams of the same breed wherever they could be found, by never breeding from ewes after they were four or five years old, they endeavored to get rid of the colored face and legs, these being now its greatest defects, and mark its origin. If the sheep are kept till too old, these colored hairs find their way into the body. We have in our care an old ewe's fleece which is full of kemps, but they are not white, as in the white-faced and white-legged sheep, but brown. The gentlemen who were engaged in improving their stock, in addition to the care bestowed in breeding, bestowed an equal care in improving their lands, and with the improved feed succeeded in greatly increasing the size of the fore quarters, the widening and deepening the chest, obtaining greater width of back and loin, while the ribs were more curved, the trunk became more symmetrical, and the body has become larger, or the limbs smaller in relation to each other.

The wethers are usually fatted at the conclusion of their second year; though in some of their best flocks they are often ready at the age of fifteen months, their average weight being from twenty-five to forty pounds per quarter. A Mr. Grantham exhibited a pen of three Southdowns at the show of the Smithfield Club, in 1835, one of them weighing 283 pounds, a second 286 pounds, and a third 294 pounds.

While the carcass has been thus largely increased, and early maturity so wonderfully produced, the improvement of the fleece has been equally successful. The length of the staple of those kept upon the improved farms of the Downs has increased to three inches, the weight of fleece to three pounds, while the fleeces of those raised upon the more fertile fields of the lowlands have attained four pounds and over, and the length of the staple reached four inches. This has been accomplished without the introduction of any other breed.

Jonas Webb, Esq., of Cambridgeshire, who never made a cross with any other breed, but by a careful selection of his ewes from the best flocks in the kingdom, and retaining none but the best of their progeny, and selecting the best bucks from the best flocks in the country, improved the breed to such an extent that the average weight of his fleeces from one hundred and fifty to two hundred sheep each season, was about eight pounds. The quality of the wool has been greatly improved at the same time that it has been increased in quantity. It has lost much of its harshness, and has increased in softness and pliability. It can no longer be called a short, furzy wool, but the improved breed can take their place among the best English combing breeds, not for producing warp wool, but for producing the best of filling. Though not belonging strictly to the long-wooled class of sheep, the place of the improved breed is not with the short-wooled class. We noticed in the Massachusetts Ploughman* of December 5th, 1863, some remarks upon this subject, in connection with a letter from a gentleman who had been compelled, as one of a committee at an agricultural show, to class Southdowns with Cotswolds, thus ranking it with a first class long-wooled breed. The editor of that paper, however, is equally at fault in endeavoring to force it back to the short-wooled class, where Professor Lowe found it, and where he left it, although at the time he wrote the improved breed had ceased to be a short-wooled sheep.

The term short-wooled, was first applied to those sheep whose fleeces were only fit for carding, and long-wooled to those which were used for combing only. At that time it was not considered possible to comb wool whose staple was shorter than four inches; and it was thought equally impossible to card any thing longer than two inches; and the sorter of long-

wools at that time was required to cut down with his shears all skirtings longer than that, to the required shortness. Since then Saxony and Merino wools have been combed whose staples were not more than one and a half inches in length, and wool four inches in length is considered good carding wool. It is evident from this that the old classification of breeds has been rendered of little practical value; for, according to that classification Saxony and Merino are both classed as short wool, yet large quantities of both are produced, which are good combing. The Southdown ought to be classed as a middle-wooled sheep, which is its proper place, yet it never ought to be brought into competition with either Cotswolds, Leicesters, or Oxford Downs, or any of the old-styled long wooled sheep; neither should Saxony or short-wooled Merino be brought into competition with the long-wooled Merino. But probably the time has not arrived for a very close classification of sheep at our cattle shows; if it has, then they ought to be classed according to different breeds, and different varieties of the same breed. But as they are now classed, it would be as proper to class a thoroughbred horse and a Clyesdale horse together as a Southdown sheep and a Cotswold.

The history of the improvement of this breed of sheep teaches us some important lessons. One is that the improvement of land and of stock are inseparable. Another is that whoever would succeed in sheep husbandry, and particularly of Southdowns, must be careful in the selection of their ewes, their rams, and of the age at which they cease breeding; they must avoid breeding from all stock whose form leads towards the old unimproved, but select those which exhibit the best points of the improved breed. Neither must they be sparing in the amount or in the character of their food; if they are heedless about these things, they may expect to see the Southdown, with all its present acquired valuable characteristics, go back, not by slow and almost imperceptible degrees, but by rapid strides, to the place it occupied a hundred years ago, before Mr. Ellman commenced his improvement, and before the valleys of the Downs were rendered sufficiently fertile to afford superior food to the short grass of the sandy hills.

In the county of Gloucester, England, running parallel with the rivers Avon and Severn, are a range of limestone hills about fifty-four miles long, and in some parts eight miles broad, the highest point being about 1134 feet above the sea level. The soil is a clayey loam. Upon these hills from time immemorial, has been raised a class of sheep called Cotswolds, to which the hills owe their name, and from these hills the sheep derive theirs. For in ancient times the sheep were kept during the night in large houses, capable of containing from one to five hundred. These houses were called cots, or cotes, in which the sheep were sheltered to protect them from

wolves. Would or wold signifies a barren hill—the compound word meaning sheep folds on barren hills.

Around sheep bearing this name, tradition and history have endeavored to weave a classic wreath. William Camben, a Latin writer, in his Britannia, published in 1586, says of these hills: "They feed in large numbers flocks of sheep, long-necked and square of bulk and bone, by reason, as is commonly thought, of the weally and hilly situation of their pasturage, whose wool being most fine and soft, is held in passing great account amongst all nations." John Stowe, another writer of the sixteenth century, says in his chronicles, that in the year 1464, "Edward the IV., concluded an amnesty and league with King Henry of Castile, and John, King of Aragon, at the concluding whereof he granted license for certain Cotswold sheep to be transported into the country of Spain, which have there since mightily increased and multiplied to the Spanish profit, as it is said." Some writers have been so exceedingly vain as to assert that this importation was the origin of the Spanish Merino. Michael Drayton, in his Polyolbion, published in 1613, contrasts the rich fleeces of the Cotswolds with those of the Ryeland flocks, raised in the vicinity of Sarum and Leominster, and though for fineness he yields the palm to the Ryeland, he claims for the Cotswold the heavier fleece.

"T' whom Sarum's plaine gives place though famous for its flocks,
Yet hardly doth she tythe our Cotswold's wealthy locks!
Though Lemster him exceed in fineness of her oar,
Yet quite he puts her downe for his abundant store."

Adam Speed, writing in 1628, describes the wool of the Cotswold sheep as similar to that of Ryeland: "In Herefordshire, especially about Lempster, and on those famous hills called Cotswold hills, sheep are fed which produce a singular good wool, which for fineness comes very near to that of Spain, for from it a thread may be drawn as fine as silk."

The comparing the breed of sheep that at that time was raised upon the Cotswold hills with the Ryeland breed, is all we know of it at the present day. The Ryeland was one of the smallest and finest wooled sheep in England. And when we consider that at that period the Cotswold hills were bleak and barren wastes, we are certain that a sheep as large as the present breed could not subsist there. But when or how this small breed became extinct upon these hills we know not, nor do we know from whence came the large breed that now occupies its place and bears its name. Some are of the opinion that the large breed has been produced from the small one by careful breeding and feeding. But the characters of the former and present breed prevent us from arriving at such a conclusion, and a traditionary belief exists among the inhabitants of these hills that

the modern breed is not the original race of the Cotswold hills. For though Camden describes the ancient breed as being square of bulk and bone, this must be taken as compared with the small surrounding breeds.

The most reasonable theory is that when they began to enclose and cultivate the hills, a larger breed was introduced, which, in some instances, was crossed with the small breed; in other cases the smaller breed was withdrawn or killed off, and the large one took its place. This change in all probability commenced in the reign of Elizabeth, for although Speed writing about this period, describes a fine wooled breed, similar to the Ryeland. Markham describes a long wooled breed upon these hills. This point is well established that when the hills were barren a small breed of sheep was kept, and increase of size and improvement of breed kept exact step with the improved cultivation of the soil, for the long wooled breed has undergone a great change within a comparatively recent period. Formerly they were described as a very large, coarse, long-legged flat-ribbed variety, light in the forequarters, shearing a long, heavy, coarse fleece of wool. They were hardy, prolific breeders, and capital nurses, yet deficient in early maturity, and not possessing very good fattening qualities. They were not fed upon the hills where they were raised, the herbage being insufficient, but the wethers when two and three years old, were sold into the valleys of the Severn and Thames, where they were fattened at about four years of age.

But the improved tillage of the hills, the production of vetches, artificial grasses, among which sainfoin and the clovers form no small part, and the production of roots, and the improvement of the breed has changed to a great extent its character. The forequarters are now much larger, and their ribs more rounded, their back and loins much broader, and altogether they are much better built than the old breed, but are not now remarkable for a very fine form; their hindquarters are large, and when fat they carry a large portion of it upon their rumps.

These hills now fat all the sheep they raise, and that number is greatly increased. Now the wethers are brought fat to market at twelve and fourteen months old, weighing from fifteen to twenty-four pounds per quarter, and at a year and a half and two years old they weigh from twenty-five to thirty-five pounds per quarter. The medium weight of their fleeces is from seven to eight pounds, the length of staple from six to eight inches. This, however, will be regulated by the feed—better the feed the longer the staple, heavier the fleece and mellower the wool.

The rams sometimes reach near four hundred pounds, and shear thirteen or fourteen pounds of washed wool. Good ewes will occasionally weigh

two hundred pounds, and shear twelve pounds of wool. The staple of some yearling bucks will measure from twelve to fifteen inches.

The Cotswolds rank among the first of the long wooled and mutton sheep. Their wool is well adapted for the production of the coarser kinds of worsteds, though in England the wool sheared from well fed sheep is used in the production of a medium class of goods.

Mr. Flint, in his report of the exhibition of the Royal Agricultural Society, says: "They excel most other breeds in a combination of weight of carcass, wool, and quality. The prominent points of those at the fair were the broad, straight back, fine neck and shoulders, and great length of quarter. As an instance of the prices which this popular breed brings in England, it may be mentioned that in 1861 thirty-five rams sold at an average of over $172 each."

He further says: "They all had *the large foretop on the forehead.*" There are breeders in this country who say that the foretop is not a distinguishing feature of this breed; but the want of it is a sure sign of the presence of some other breed. The pure breed may be further described as having a long and rather thin head, face and legs white, the ears wide but not thin, and without wool. The wool comes down to the knee and hock, and covers the neck and chops.

This breed affords us another very striking instance of the benefits arising from good feed and good care—the return is a good supply of first class mutton at a very early age, and a good heavy fleece; and if the English farmer can make such improvements in stock, and upon land which he does not own, and make money, what ought the American farmer to do who owns his own land and obtains as good a price for his wool as the English farmer, and to-day receives twenty-five cents per pound more than is paid in England for the same kind?

THE BREEDING OF THE NEGRETTI SHEEP AND THE ESTABLISHMENTS FOR THE BREEDING OF SHEEP IN MECHLENBURG.

BY W. SETTEGAST.

TRANSLATED BY JOHN H. KLIPPART.

The breeding of the Merino sheep in Mechlenburg has lately attracted the attention of agriculturists far and near, who are observing the so-called "contention for the golden fleece," in which the Agricultural Advertiser

of the Berlin Banking and Commercial News was the chief participant. Yet many who have read the animated articles published in the above named paper, may have been unable to determine whether the one or the other of the views presented be the correct one, for the simple reason that they had no knowledge of the establishments for the breeding of sheep in Mechlenburg, based upon their own observations. Party contentions, in which, as in the above named discussions, the leaders are justifiable in always keeping an eye upon their own private interest, render it difficult to those not immediately interested, to derive any information from an unprejudiced judgment in regard to the subject of controversy, and to decide on the correctness of the one or the other of the views presented.

It is known that this discussion, which became animated on account of the importance of the subject, and which was at last *settled* rather than brought to a final decision, by the soothing words of Mr. Mentzel, turned upon vital questions, in which the development and future condition of the breeding of the Merino sheep in Germany were involved, namely: whether in general, the Escurial (Electoral) race be preferable to the Negretti race, or *vice versa;* and whether, in particular, the breeding and keeping of the Negretti sheep in Mechlenburg furnish larger net profits than the breeding of sheep in Silesia and those regions where the breeders in this branch have adopted the same or a similar method, as in Silesia.

I have been engaged for many years in the breeding of the Merino sheep, and on the yearly excursions in company with my pupils, had the opportunity of becoming acquainted with the condition of breeding in different regions, yet the establishments for the breeding of sheep in Mechlenburg were unknown to me. Of course I had now and then seen bucks and ewes from that country, but I knew that the state of the sheep breeding in any country cannot be determined according to the properties exhibited by such individual specimens.

In the spring of 1860 I made an excursion with several of my pupils, for the purpose of inspecting different establishments for sheep breeding, in order to obtain a general knowledge of the present state of it in Mechlenburg, and, from my own observations, to approximate to a solution of the above question—whether and how far the method of breeding in that country might furnish some material for improvement in other countries.

In venturing to state the impressions I received, and to inquire into the merits of the methods adopted by prominent breeders, I fully appreciate the difficulty of my task; but, on the other hand, I am convinced that the agricultural public in general, and in particular, those men who are immediately concerned in these communications, will prove forbearing and unbiased critics. Although I believe to have kept myself aloof

of any party views and prejudice, yet some breeders of sheep, having observed, with deepest interest, the different methods of producing wool, and formed an opinion in regard to the expediency of the one or the other, will hardly be able to examine into the subject, unbiassed to such a degree as to prevent their present views from reflecting upon the new picture presented to them. Thus, without showing it myself, the same may have happened to me in making my observations and drawing conclusions therefrom. From this point of view I would ask the gentle reader to receive the following statements of the corrections of which I have convinced myself. My pen shall never be governed by that anxious precaution, which, in treating on similar themes, contents itself with allusions, speaks by omissions, and presumes the ability in the reader of interpolating between the lines; but suffice it to say, that I speak only for the sake of the subject itself, and that this alone could induce me to name persons.

To obtain information on the conditions of a very extensive branch of the breeding of domestic animals in a foreign country, by sojourning in it, and to avoid errors in attempting to arrive at conclusions applicable to the whole from what is seen here and there, and thereby to obtain a general view of such a vast range of efforts made for various purposes, is surely no easy task. To mention this difficulty also, seems not superfluous in discussing questions of great importance to the public, in which the most different interests are concerned, and in this connection I will admit that on my excursion to Mechlenburg, many things may have escaped my notice which it would have been proper to take into consideration in forming a general review. If this should be the case, I would ask the more initiated ones for a correction of my views, provided, that it be done for no party purposes.

Even a hasty inspection of the flocks of that country show the incorrectness of the opinion prevailing abroad, that the Merino sheep there are the product of the same method of breeding, and that the animals in the various flocks, which are comprised in the brief term of "Mechlenburg Negrettis," do not differ from one another in their essential, characteristic properties. This supposition is still more erroneous than the term "Silesian Merino sheep," frequently comprising elements essentially different. Such a commixion of the Mechlenburg Merino sheep in the above stated sense is unjustifiable, as may easily be shown. There are two breeds which are distinguished very readily by inspecting the establishments in question, and which furnish very different issues. But the easiest way of discerning and characterizing them may be by inspecting the representatives of both those breeds, the stock establishments, which take the lead, and by furnishing the animals for breeding from amongst their own or

filial flocks, exert a deciding influence upon the great mass of the less independent establishments. Then we meet with the stock establishment of Baldebuck, belonging to the Prince of Bueckeburg, as the most prominent representative of the one breed, while the other breed is represented by several famous stock establishments, among which I will name those of Passow, Weisin, and Lenshow. Here it is proper to remark that several flocks in Pomerania are frequently mentioned in connection with the above named establishments, and are placed as Mechlenburg Negrettis in the same category with the above, as if they belonged to that country. There is no objection to this, if descent and breed are the same; but if it is a question of country as to which the glory of possessing such herds belongs, we must reclaim them as purely Prussian. Among these may be mentioned the flocks of Kenzlin, Sarow,* Klempenow, and others.

In considering the question as to what Mechlenburg may furnish to other countries for the improvement of the breeding of Merino sheep, the first thing will be to determine the characteristics of the two breeds or their representatives in that country. But before entering upon a description of this kind, I deem it necessary to premise some remarks on the way and manner in which I shall express my views in regard to the condition of a flock in the most precise terms in order to make it comprehensible to others.

To form a correct estimate of the value of a sheep, it is necessary to examine separately the various properties on which the worth of the animal depends, and to determine their value. The same method is to be adopted in valuing whole flocks, for in this case a number of animals are to be examined, the correct *average* ratio of their several properties is to be found, and their own worth and that of the whole flock are to be computed accordingly.

The properties constituting the value of a sheep which shall prove profitable, primarily, by its wool, and, secondarily, by its flesh, either belong to its stature and bodily development, or are connected with the cover of its skin, the wool. The superiority of bodily development is important, not only because it constitutes the extension of the wool field, but also because it invigorates the constitution of the animal, influences its worth for breeding, and, finally, exhances the value of the sheep by the larger quantity of meat. But the worth of wool also depends on its many different properties; and to determine them all with regard to the stature of the animal, by a correct description, and to depict clearly the natural relation of these properties to each other—this is the task of him who undertakes to render a judgment upon a flock of sheep.

* The Sarow flock has lately been removed to Mechlenburg.

In order to meet these points, I have found it convenient to designate the properties of an ideal Merino sheep, collectively, by the number 100. This is made up by

I.	Stature. (Normal size and form, beauty of the head, strong and well-set legs).	20
II.	Richness in wool. (Length, closeness, density, and growth)	20
III.	Power and character. (Strength of wool, decidedly normal, clearly developed curling, nerve)	20
IV.	Nobility. (Normal staple, of great density, yet easily divisible)	20
V.	Fineness. (Truthfulness of the wool fibre, and equality of wool)	20
	Total	100

An examination of an establishment for the breeding of sheep, according to this scale, must show how near it approximates the culmination of what may be accomplished by breeding in regard to the various properties of the animals and of the whole flock, and what station it occupies on the field of the breeding of sheep, the chief aim of which is the production of Merino wool.

By this scale for measuring the value of sheep, the above named Mechlenburg stock establishment at Boldebuck may be characterized as follows:

I.	Stature	18
II.	Richness in wool	18
III.	Character	12
IV.	Nobility	8
V.	Fineness and quality	8
	Total	64

This number will also approximately designate the condition of other Mechlenburg establishments where the breed is governed by employing bucks from Boldebuck, at least I was informed so there, and found it true by examining several flocks of this category. As an instance, I mention the model and remarkable establishment of Mr. Kortruem, at Jena.

I.	Stature	16
II.	Richness in wool	17
III.	Character	10
IV.	Nobility	10
V.	Fineness	10
	Total	63

The Boldebuck flock enjoying a high reputation in Mechlenburg, has an extensive sale of bucks for breeding. It is interesting to pursue the history of its origin and the principles by which the breeding was consistently governed, of which an examination of the chronicle of that establishment furnishes much information. The plan was to found a Merino stock establishment at Boldebuck, and, therefore, "His Highness, the

Prince himself, has written to Mr. Tessier, of Paris, a learned author of renown, director of the old royal stock establishment at Rambouillet, and proprietor of a peculiar, selected Merino flock, asking for thirty head of ewes and three young bucks. The intention is that this small flock shall be kept unmixed with domestic animals, or even other improved sheep that may be claimed to be of the pure Merino race, and thus be propagated. As the flock of Mr. Tessier undoubtedly is of the pure Spanish Merino race, and descendent from the most prominent breeds of the same, being purchased from the most celebrated flocks of Negretti and Infantado, a degeneration is not to be apprehended, if the flock here is carefully kept by itself alone."

The Boldebuck flock has been propagated to this day, in strict accordance with these principles of breeding proposed at the beginning of the present century, and, of course, the essential points have been preserved as they were originally received, which is evident from a comparison of the samples of wool of the period of infancy of the establishment with the samples cut at more recent times, and the wool produced at the present day. In this instance also it has been proved how detrimental it is to the improvement of the breeding of domestic animals, to attach too much importance to the race, and to suppose that the chief end of breeding is attained by watching over the purity of the same. Not the purity of the race, but the most careful selection of the most excellent specimens for certain purposes, and a judicious appropriation of such material, will give us the means for further progress. The samples of wool from imported animals I saw at Boldebuck, and other samples from Merinos originally imported from Spain, which I saw at several places, show clearly that most of the animals imported at that time stand far below the level of our present flocks which have been bred with intelligence, and are of mixed bloods. Further, they confirm the statements made by agriculturists of that ancient period, that the Merinos imported from Spain showed the most striking difference and variety in their statures and forms of wool, in no less degree than the animals of our days, no matter whether they be full-blooded descendents of the former or of mixed blood. This shows us, and our own experience furnishes further proof for it, that the one portion of the material derived from Spain was in full possession of the elements required for the development of the valuable properties, while the other portion possessed them, as it were, only in embryo; and that this race also, owing its existence to culture, cannot be conserved and further developed except by the science of man, by judicious keeping and rational breeding. Upon these conditions the continuance of the race depends, and without them it will lose its valuable properties so far as not to

be distinguishable from a common mongrel flock. Yet in the course of my essay I shall have occasion to inquire more particularly into this subject.

But to return to the Boldebuck flock. I repeat that it has an extensive sale of bucks, which, however, is confined chiefly to Mechlenburg. It might appear strange that this stock-flock, meeting with great favor in a large portion of that country, and boasting of a rapid sale of its marketable bucks, does not occupy a higher station, according to the computation of its points in the above scale. The agriculturists there being intelligent men, and evidently endeavoring to meet the demands of the age in this branch also, we must suppose that the preference shown to the Boldebuck blood is justified by properties which escape the notice of a foreign observer. It is probable that, on account of the food and pasture in that locality being particularly favorable to the production of card-wool (?) these Merinos may thrive in a most satisfactory way, or that their fattening quality, in connection with the portliness of stature, or their hardness in withstanding the injurious effects of the weather, may turn the scales in their favor; thus, several points may combine which, in the eyes of the agriculturists of that region, give this blood a value that cannot be estimated by an examination of the animals instituted by a stranger unacquainted with such particularities, or be appreciated in larger circles.

It, therefore, seems to be a matter of fact that the stock-flock of Boldebuck and its affiliated flocks are not qualified to furnish other regions and countries any material for improvement in the breeding of Merino sheep, because they themselves seem to be in need of improvement. An admixture of this blood in localities where the breeder must have regard to the quality of wool, would not only afford any improvement, but in all regions in which the development of a good character, the nobility, fineness and equality of wool are claimed to be attained by breeding, it would cause a decided deterioration, which could not be counterbalanced by any possible improvement of the breed in respect to stature and richess in wool.

It is evident that animals of this kind, though they may be of value in more limited circles, could not meet with favor, where, in estimating the value of an animal for breeding, the quality of its wool is the chief point in consideration, and where, by consistent endeavors in the course of nearly half a century, the breeder has succeeded in bringing forth a production in which all the desirable properties of the wool fibre were combined. Such a production, though not always commanding prices corresponding to its value, yet fully appreciated by manufacturers in all countries, and protected by judicious keeping, from all injurious influences from abroad, was wrought into a fabric of which the breeder was justly proud. And now

this Mechlenburgian intruder, the descendant of Boldebuck blood, finds himself reflected on exhibitions of domestie animals or wool marts. The producer of the noble cloth-wool cannot but look down with pity upon these animals, to whose card-wool staple, which has hardly ever been embellished by anxious keeping or particularly cultivated, even the most vivid fancy cannot concede any resemblance to pearls, cauliflower, or rape seed; but with horror he hears the question put to him whether he will make use of such bucks for improving the blood of his flock; and he refuses with indignation. No one will say he is wrong in this respect, but it must be admitted that, under the circumstances above stated, it would be a gross mistake in breeding to jeopardize that beautiful wool of Silesia, the triumph of a noble passion, of profound meditation, and persevering endeavors to "*Mechlinburgize*" it. But the only wrong committed was to suppose that such as were exhibited as specimens of the one breed only of Mechlenburg sheep prognosticated what material the breeders of Merino sheep had to expect from that country; and further, it was wrong to suppose that these animals represented the characteristic type of Mechlenburg Merinos *in general.*

If we are not mistaken, the erroneousness of this supposition becomes evident from an inspection of the above named flocks representing the other breed of Merino sheep bred in that country. In the language of breeders generally, and not unfrequently on the part of the proprietors, these are emphatically called "Negretti" flocks, and besides are honored by the epithets of "pure," or "original," or "original full-blood." Here it seems necessary that we should define the term "Negretti," lest the question be always put anew what it really means, and what idea is connected with it.

It is generally known that at the time when the breeding of Merino sheep was most flourishing in Spain, the flocks of Count Negretti were among the most numerous and noblest of that country; but, according to the reports on the condition of the various establishments, the forms of the body and the wool of those original Negretti sheep essentially differed from those which a Merino sheep of the present time is to possess, in order to lay claim to the appellation "Negretti." Yet it is a fact that none of the so-called Negretti flocks of our days, though they may be called "pure," or "original," or be honored by any other epithet, is able to show its descent from the flocks of Count Negretti.

Like any cultivated race, the thoroughbred Merino sheep also possesses, in an extraordinary degree, the faculty of variation to yield to the efforts of the breeder, to assume various forms of body and wool. This variety of formation, of course, made its appearance as soon as, after their impor-

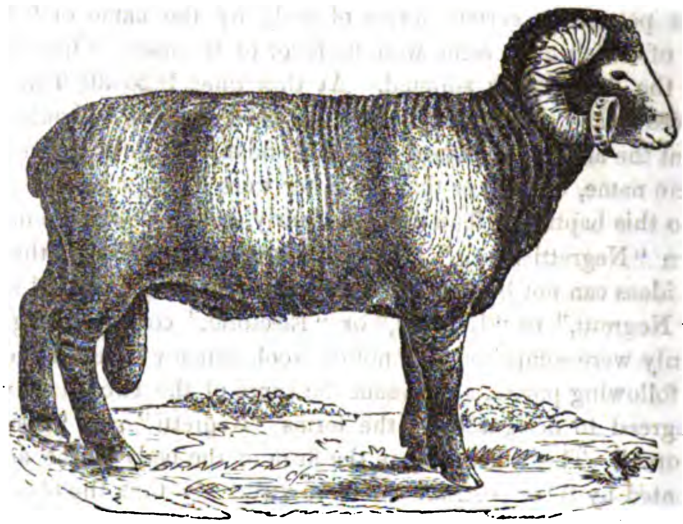
tation from Spain, the Merinos began to be bred in other countries, on an extensive scale. Soon the breeders felt it to be an urgent desideratum to find terms designating such types, for their mutual understanding; and thus, at the instance of our immortal Thaer, who zealously and successfully engaged in the breeding of Merino sheep, they agreed in designating Merinos possessing certain forms of body by the name of "Negretti," instead of which term some were in favor of the name "Infantado," but at last the former was adopted. At that time, 1820–30, Thaer insisted that these or any other similar terms, such as "Escurial," should not insinuate that the animals so named were descendants from the Spanish flock of the same name, but rather that the latter were "only asked to stand sponsers" to this baptism. This defines clearly and precisely the meaning of the term "Negretti sheep." Yet here it must be remarked that a confusion of ideas can not be prevented except by bearing in mind that in the term "Negretti," or "Escurial," or "Electoral," corresponding forms of body only were comprised, but not of wool, as many believed and insisted.

The following portraits represent the types of the two races which we have agreed to designate by the terms "Negretti" and "Escurial," or "Electoral." The differences in the form of the body of the animals are represented by these portraits no more strikingly than the observer finds them daily in the various flocks of our country; they are so apparent that it seems unnecessary to furnish further particulars. But if the question is

Portrait of NEGRETTI Buck No. 5, of the Imperial flock at Waldau, drawn in 1860. N.

put to us, whether the variety in the forms of the body is or must be connected with analogous differences in the nature of the wool, we answer in the negative. When we meet with a longer and coarser wool, having more

yolk now and then less easily soluble, on the Merino sheep than on the Escurial race, when in regard to the softness of the fibre, its truthfulness and equality on various parts of the body, the former appears to be inferior to the latter, these differences are not to be considered as characteristic and peculiar

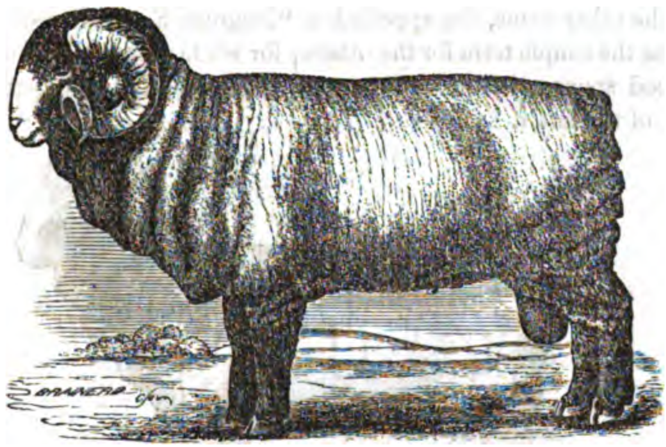


Portrait of Prize ELECTORAL Buck. E.

properties of the race, but are caused partly by mistakes in breeding, partly by the efforts of the breeders in certain directions. Apparent facts would be denied by the assertion that the properties of the Negretti race render it impossible for the breeders to succeed in developing the highest degrees of fineness of wool, to impart to it any desired length, (so far as the Merino blood admits of the development of this property,) and to establish the softness, truthfulness, and equality of the wool fibre, and the easy solubility of the yolk. Thus, Raudnitz in Silesia, Lenshow in Mechlenburg, and other establishments present the highest degrees of fineness possibly to be found among the Merino race; and yet there are Negretti flocks, as, for instance, that of Kenzlin in Pomerania, whose stock presents such a softness, truthfulness, and equality of wool, and as good a character of yolk, as any of the better Escurial flocks. Thus, whatever properties of wool may be taken into consideration—length, equality, truthfulness, nobility, power, &c.,—none of them are the exclusive property of any of the races named; but, according to skill and direction in breeding, these properties will be developed or be wanting, generally or individually, now in the one and then in the other of these races.

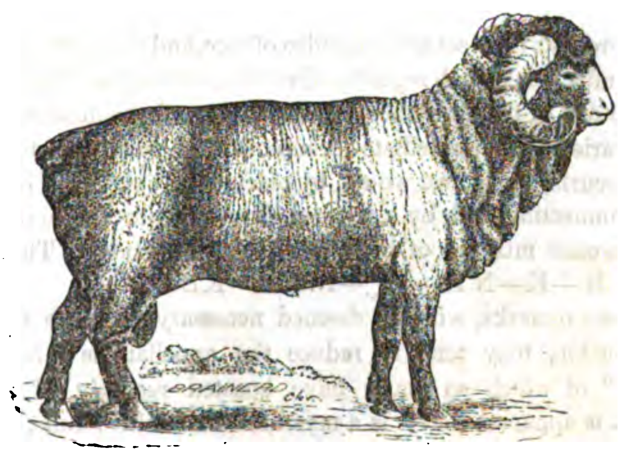
It is, therefore, easy to prove that the characteristics of the Negretti and of the Escurial race consist in the forms of body only, and not in those of

their wool. Further, it must be remarked that the form of body which makes the one animal an Escurial and the other a Negretti sheep, is and remains so far and so long only the property of the flock, or respectively, the race, as the breeder desires it, and directs his efforts in the science of breeding to the preservation of this peculiar property.



Portrait of a buck having a *Negretti* sire, and dam a cross between a Negretti buck and Electoral ewe; usually called a three-fourth blood Negretti. N.N.E.

In another essay* I think I have proved by undoubted reliable instances, that a perfectly-developed Negretti flock may be transformed into an Escurial flock without any admixture of blood. Thus, in the course of a

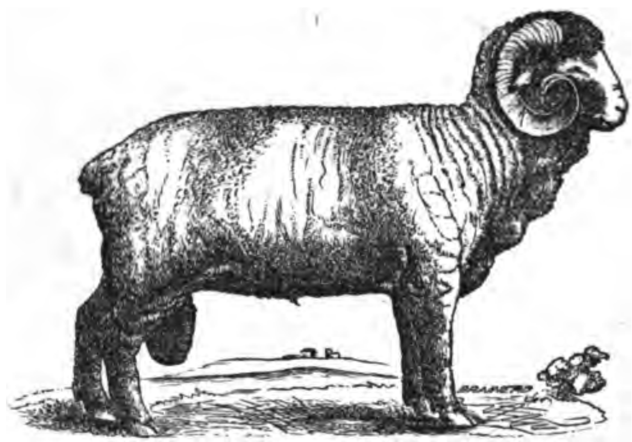


Portrait of buck having a *Negretti* sire and *Electoral* dam; usually called a half-blood. N.E.

process of transformation, which may be effected by breeding as well as by crossing, there will appear many intermediate formations, for which to

* On the breeding of domestic animals, &c., Berlin: By Bosselmann, 1859, p. 17, &c.

find proper terms is of no less importance than for the perfectly-developed forms of the Negretti and Escurial race. Silesia, for instance, possesses flocks which have as just claims to the name "Negretti" as any in Mechlenburg; but those standing in the middle, between the Negretti and Escurial, are most numerous, since we can not designate them properly by the one or the other name, the appellation "Negretti-Escurial race" is as justifiable as the simple term for the others; for while a Spanish count or a convent stood sponsor in the former case, both are invited together at the baptism of the latter.



Portrait of buck having an *Electoral* sire, and dam a cross between Negretti buck and Electoral ewe; usually called a three-fourth Electoral. E.E.N.

Even here also, if we set aside the idea of race, and designate only the stock, flocks or individuals, with regard to their form of body and their approximation to the one or the other race, it is desirable to find similar terms to designate the variety of intermediate formations. If we designate Negretti by N., and Escurial by E., we would, by placing the one or the other letter in front, or connecting both by a $\smile\smile$, express a prevalence of this or that blood, or a close mixture of both in equal proportions. Thus we obtain the marks N.—E.—N.E.—$\underset{\smile\smile}{\text{N. E.}}$—N.N.E.—E.E.N.

The above remarks, which I deemed necessary to make the following comprehensible, may tend to reduce the appellations "Negretti" and "Escurial," of which so many have boasted recently of their actual worth. It is apparent that it is a mystification to the public, if an advertisement for the sale of animals for breeding is headed "Negretti," although the form of body which make an animal a Negretti sheep are not found in the flock. This may happen, yet the mystification remains as great, even if the progenitors of the animals possessed the characteristics of the Negretti race.

It is evident on what foundation the assertion, made here and there, of possessing the "pure" Negretti race, is based. It is shown above that it can not mean the descent from animals of Count NEGRETTI, and even if this were actually the case, it would amount to nothing, except they possess those properties which we expect to find in the Negretti sheep.

After this digression, I return to the aforementioned flocks at Mechlenburg, at Waisin, Lenshow, Passow, and others. According to the above remarks, it would be vindictive to claim for them and their kindred flocks the exclusive right to the appellation of "Negretti flocks;" but it may be interesting to inquire how far they may be entitled to the distinction of "full-blood Negretti flocks," often given them. To answer this question we have to go back to the descent and origin of those stock-flocks, which leads us to the establishment at Hoschtitz, Moravia. In the latter half of the last century it was constituted out of nearly the same blood as that imported from Spain by the Imperial State stock-establishments of Austria, which is said to be derived chiefly from the flocks of the Marquis d'IRANDA—the same with which also the stock establishments of Saxonia were chiefly supplied, by the second importation of Merinos from Spain.

Thus it was to be expected that these flocks, so near kin by their common descent, namely, the Austrian State establishments of Holitsch and Mannersdorf on the one part, and the private establishment of the Baron von GEISLERN, at Hoschtitz, on the other part, would, in the course of time, produce equal, or at least, similar results of breeding, although the former had an advantage over the latter in respect to pecuniary means and solid foundation. At first it seemed that Holitsch would maintain a superiority: those forms by which an animal called a Negretti sheep is characterized, and which were as much liked in Austria as they were despised and sought to be done away with in Saxonia—those robust statures, with double chin, folds in the skin, and a most excellent covering of wool from the head to the hoof, were bred in large numbers at Holitsch, and met with the greatest favor in the eyes of the public. Corresponding prices were allowed for animals for breeding, coming thence. In the year 1814, marketable ewes were sold at 20 to 45 guilders, but bucks were much dearer, so that 1,000 guilders were allowed for the best specimens, and some years later even 3,000 guilders. But this did not last very long; and again in this instance, it is shown that a cultivated race may furnish the breeders with the material for development in that direction in which he seeks to attain to perfection for his purposes, but that without the application of scientific breeding it descends lower and lower from the height of the station it obtained, and loses more and more of its valuable properties, until arrives again at the stage of its originality, when it has no other interest

to the highly scientific breeder than that of an instructive and warning example.

The establishment at Holitsch had the misfortune of being conducted by men adhering to the opinion that the unmixed purity of the race is the principal thing, and that if the race be preserved in its purity, "a degeneration," as the Boldebuck Chronicle expresses it, "is not to be apprehended."* On a visit in the year 1857 I found there the most energetic advocates, by word and deed, of the theory of race and constancy. A large number of the younger and older bucks were shown to me, but I could not find among them a Negretti, or even an animal of any considerable value for breeding. I asked them to show me the bucks used for breeding. "They are among the flock." Further, I asked to be shown the best buck of the flock. "We deem them all to be equal." To this touching confidence in the infallibility of a dogma, the condition of the whole numerous flock corresponded:

I.	Stature	15
II.	Richness in wool	15
III.	Character	15
IV.	Nobility	5
V.	Fineness and equality	5
		55

Thus we see in this instance that one of the oldest and once so celebrated Negretti stock flocks, established at enormous expenses, and preserved pure without any admixture of other blood, in the course of a free process of development, not only is transformed into Escurials, but that in spite of its perfect purity of blood, it occupies a station giving so little satisfaction, according to the views of the present day, as hardly to excel a common neglected mongrel flock.

But the thing was quite different at Hoschtitz. The breeding of the Merino sheep in Germany has had the good fortune of engaging a number of able and influential men, possessing all the qualifications indispensable in breeders (devoted predilection for the subject, energy of character, consistency in pursuing a fixed end, discretion and keen observation) and laboring for its development and perfection. Among these men who have proved meritorious to our fatherland, the Baron von GEISLERN, of Hoschtitz, appears in the first rank. Out of the same material as was bred at Holitsch, he created in the course of a series of years, one of the most

* BERNARD PETRO, in his work entitled "The Whole of Sheep Breeding," at that time considered the best authority, speaks most frankly and concisely on this subject, thus:

"The principle of crossing, often so ingeniously applied by us for the purpose of effecting improvements, is not adopted in the case of the proper Leonic Merinos in Spain, for this reason: *Because these animals, as a race, need no improvement.*

excellent flocks which Germany has possessed to the present day. His method of breeding was not based upon the purity and constancy of the race, but on the ability of prominent animals as to what they might produce for certain purposes. To distinguish prominent individuals excelling the mass—to fully appreciate their merits, and use them energetically and consistently in the pursuit of certain fixed purposes, these qualifications have ever been instrumental in securing extraordinary success in the breeding of animals, and von GEISLERN applied them. "The eagle is the only noble fowl." This was his principle of breeding, and the eagles of his flock should be powerful figures—*Negretti figures*. During the period while the animals with long legs, thin and long necks and pointed heads, without any folds in the skin, met with the greatest favor in Saxonia, and were spread thence over other parts of Germany, von GEISLERN firmly adhered to his method of breeding; considering the beauty and harmonious structure of the frame to be of no less importance than the superior merits of the cover of the skin. Further, while more and more sacrifices were made for the development of *only one* property of the wool—its fineness; while in connection with the growth of the body beyond the proper measure, that of the wool was furthered also; while animals like "air and vapor" were fashionable, and poverty in wool found favor, our breeder was not induced to deviate from his method, which was generally condemned at that time. He did not produce his wool for the cabinet, but endeavored, now as ever, to preserve, beside the greatest possible fineness, the still more important properties of nobility and strength. The proper length of the wool, developed to such an extent as not to preclude its being used as a good cloth-wool, density of staple, and such a growth as to cover the head, the belly and the legs of the animal, were points not to be neglected.

The question seems to be natural how it happened that while the deepest interest in the breeding of Merino sheep prevailed since the beginning of the present century, a flock so carefully used and possessing such superior merits, according to the views of the present time, could remain generally unknown so long beyond a comparatively limited territory, without exerting a powerful influence upon the method of breeding Merino sheep. This was occasioned partly by the above-mentioned errors on the part of breeders, who despised the most excellent specimens if they were not bred with a tendency toward the ideal of that time. But later, when this error was condemned—when it was acknowledged that most effectual remedies were to be used in order to elevate anew and to perpetuate the breeding of Merino sheep, which, through the tendency to partial fineness of breed, was in imminent danger of becoming unprofitable, LICHNOWSKY was the leading spirit of the age. The reputation of his flock increased from year to year, and so completely chained the attention of breeders, that other

flocks were forgotten, or not noticed, even if they possessed all the elements to rival the former. Thus the territory where the Hoschtitz flock, by furnishing animals for breeding, exerted its influence, was much more limited than that where Saxonian blood either was prevalent or modified by the Lichnowsky breed.

Yet really meritorious productions on the field of the breeding of animals, answering the demands of the age, and the actual wants, must be appreciated sooner or later, so the successful efforts of von GEISLERN were not to be buried with that able breeder, but further developed and spread by a worthy pupil.

Here we have to name, with due praise, Mr. MAASY, of Kenzlin, member of the Economical Council. Anything excellent the master had contrived and formed, the disciple had conceived and appreciated, and, following in his steps, continued the work commenced by the former, forming and improving with discretion. Thus, this vigorous, though old man, may now, after exerting the most strenuous efforts for nearly half a century, point to the results of his method of breeding and give an account of the legacy of his preceptor, confident of the approbation of his cotemporaries. Let us try to characterize the Kenzlin flock by figures:

I.	Stature	19
II.	Richness in Wool	18
III.	Character	19
IV.	Nobility	18
V.	Fineness	18
		92

This number shows better than could be done by a voluminous description, how near the breeder approximated to the ideal of the Merino sheep. Few, very few flocks indeed, can boast of so high a station.

The aforementioned Mechlenburg stock flocks of Passou, Weisin, Lenshoro and Soron, came into existence later than the above named flock. They were descendants of the same blood with Kenzlin, deriving it partly from Medou, a Mechlenburg flock of high renown and likewise descended from Hoschtitz, but afterwards dissolved; partly from Kenzlin; partly directly from Hoschtitz; so that each of them may prove its direct or indirect descent from Hoschtitz blood. Of which other flocks in Mechlenburg and Pomerania the same may be said, I do not know, but I have no doubt that, beside those already mentioned, there are yet others which, belonging to the same category,* may lay claim to the denomination of *Hoschtitz full-blood Negretti flocks*, as the term "full-blood" comprises all

* Moldentin, Fahren, etc.

the excellent properties given to animals and conserved in them by the art of breeding, without regard to the original race. Consequently, not the purity of the race has developed a Hoschtitz Negretti full-blood stock, for otherwise the establishment at Holitsch also would be a full-blood Negretti flock, which, surely, is not the case; but the talent of the breeder has formed it out of material originally imperfect, and the art of his successors has conserved it. If we understand the term "full-blood" in this, its only correct meaning, there can be no objection to the denomination of Weisin, or Passoro, or Lenshoro, &c., full-blood Negretti flock, provided their original descent from Hoschtitz be not forgotten. Yet this descent from Hoschtitz, Holitish, or even the Cavagna d'Iranda, is not necessary at all for constituting a claim to the distinction of full-blood Negretti, because they are very different ways of attaining to it, as well as to that of full blood in general. That purity of race by itself does not constitute the distinction of full-blood is shown by the large number of ordinary flocks, whose purest Spanish blood, without any admixture, cannot be doubted, and it would be irony to call such flocks full-blood flocks; and further, full-blood stocks on every field of breeding, but particularly on that of breeding Merino sheep, shows that unmixed blood and purity of race are not necessary conditions of full-blood. Who shall deem it a usurpation to speak of Kuchelna (Lichnowsky) or Moeglin full-blood flocks? Surely, they as well as those flocks descended from them and bred with the same tendency have an equal claim to this term of distinction. Yet the history of sheep breeding proves that these full-blood stocks—Kuchelna and Moeglin—have been produced by very different admixtures of blood, and have received accessions even from Northern country sheep. Does this detract from their claim to being full-blood flocks? Surely not!

The descent of the Mechlenburg Negretti flocks and their claim to the one or the other title of distinction are not of as great interest to us as the remarkable facts that the breeders did not boast of purity of race, full-blood, and constancy, or thought the permanent preservation of valuable properties founded thereon, but labored incessantly for the conservation and further improvement of the material they had received, by *selecting* and breeding with regard to the accomplishment of a certain fixed end. In speaking of the Kenzlin flocks, we mentioned the meritorious efforts of the aged and venerable Mr. MAASY; here we have to acknowledge the merits of the KUNITZ brothers and their pupils for the improvement of the Mechlenburg Negretti stock flocks. At any place in Germany, where the breeding of Merino sheep is carried on with intelligence, the names of these men are renowned, but their doctrine and method of breeding have not been adopted everywhere as would seem desirable in the interest of

the cause. Although their influence upon the method of breeding reaches far, yet nowhere has it been more effectual and intense than among the Negretti flocks of Mechlenburg to whom it gave such a conformity as is seldom found in different flocks, even if they are descendants from the same blood.

This tendency of the KUNITZ school (as I will briefly name them, and whose doctrines I cordially approve,) kept aloof that one-sidedness which, in respect to the one or the other point, has proved so injurious to the breeding of Merino sheep. An animal is deemed excellent only, if the valuable properties of its body is harmoniously combined with those of its wool. The best and most faultless wool, even in satisfactory quantity, does not make a sheep a desirable animal for breeding, if the proportions of the body are not also normal, if the stature is unsatisfactory. It would seem, and formerly this opinion was often defended, as if in breeding sheep chiefly for the purpose of producing wool, the structure of the body were a point of secondary importance. But then it was overlooked that an overgrowth of certain parts of the body is the greatest danger to which the breeding of any cultivated race is exposed, and which, like the sword of Damocles, is threatening the fate of all thoroughbred flocks. In breeding Merino sheep, it may be noticed first either in the formation of the wool or the shape of the body, but being caused by a disorder of the entire organism of the animal, both the body and the cover of the skin, by and by, will be affected by this process of decomposition. Therefore, if a breed shall be perpetuated, and not, like a splendid meteor, shine for a short time and then disappear from the horizon, the body as well as the wool must receive the undivided and most careful attention of the breeder. The head of any animal expresses most decidedly its entire character; to the attentive observer the head of the Merino sheep will show either power and energy, or inertness, disposition to overgrowth, or even overgrowth itself, in various degrees. A head completely covered, a broad, arched forehead, a short and slightly bent bridge of the nose, and an obtuse angle of the face, are valuable points. A short, thick ear, covered, like the lips, eyelids and bridge of the nose, with short, stubby, glossy hair, so that the thin, reddish skin at those places is not transparent; a distinct line of demarcation between the stubby hair of the face and the adjoining wool-field, and no gradual transition by an interspersion of locks of wool or down, are points essential to the formation of a vigorous, noble head, not liable to overgrowth. The portraits will give a better illustration of the gradations from a vigorous, noble head, down to a fully developed overgrowth of the same, than any lengthy description.

NORMAL HEAD OF NEGRETTI BUCK.

DEFECTIVE HEAD OF NEGRETTI BUCK.

Attentive breeders have always acknowledged the merits resulting from a harmonious structure of the body of the animal for breeding; but a short, muscular neck, a broad breast, a deep chest, arched ribs, a broad back, forming nearly a straight line with the cross and the root of the tail, are points which never have been demanded so peremptorily as in breeding the modern Negretti sheep; strong upper arms (shoulders), broad shanks and full loins, strong shin-bones, and a perpendicular posture of the legs, were exacted with no less rigor; belly and extremities imperfectly covered were points considered of less importance.

But it is evident that these demands characterizing the breeding of Negrettis were as many barriers against the ever impending overgrowth and its pernicious consequences, and that thereby a firmer foundation was secured to the entire organism of the animals, than could have been established, if the animals selected for breeding had been judged with less rigor, in respect to the above points, and if, as it then is likely to happen, essential defects in the structure of the body are overlooked and forgotten on account of the superiority of the wool.

It has been asserted that that famous affliction causing the heaviest losses to the breeders of Merino sheep—vertigo—was not hereditary in the Negretti race, and never had prevailed among them, or was likely to ever make its appearance. This is an untenable assertion, for the posibility of the appearance of an evil, inherent to sheep generally, and even affecting the kindred goat,* cannot be denied, even in the case of Negretti sheep. If there is any truth in the rumor that now and then the vertigo makes its appearance amongst one of the most renowned Negretti flocks of France, it would be an evidence for the *possibility* of its appearance among any other Negretti flock.† But if the breeder adheres to the principle of paying the greatest attention to power and a harmonious development of the body and not sacrificing the energy of the organism to the properties of the wool, there is evidently very little danger of an appearance of the above named disease; and, therefore, as long as the breeders continue to be faithful to themselves, the Mechlenburg Negrettis give security for their lasting good health, not by the race in itself, but by the principles according to which they are bred.

I have tried to furnish a general characteristic of the flocks of Mechlenburg and Pomerania, descended from Hoschtitz blood, and now I shall consider the question so often put, namely, whether these or similar flocks, which, in the one way or the other, arrived at the same result, might contribute appropriate material for remedying the defects of the Merinos in many regions of our country, and improving them. This question cannot be properly answered before we have described, at least by general delineations, the state of Merino breeding beyond the above named district, and determined what defects are prevalent in this branch of producing domestic animals.

In order to obtain a survey of the condition of sheep breeding in general, and of the breeding of Merino sheep in our Prussian fatherland in par-

---

* In the Margraviate of Brandenburg it often happens that goats are affected by vertigo.

† Quite recently I have received, from a reliable source, the confirmed report that a flock in Northern Germany, which was fully entitled to the name of "Negretti," was destroyed by vertigo.

ticular, I ventured a few years ago to propose to the agricultural societies of the monarchy a series of questions in respect to this subject, soliciting replies. It affords me great pleasure to find here an opportunity of gratefully acknowledging the friendly courtesy with which the societies complied with my request. From all parts of the country I received reports most of which were very thorough-going, and these communications, sixty-nine in number, spoke with so rare a candor and frankness of the state of the breeding of Merino sheep at that time, that, aided by my own extensive acquaintance with the subject in Prussia, I considered myself sufficiently well informed to gain a survey of the present condition of this branch of breeding animals in general and *in toto*. Although this survey may be pleasing and bright in general, and give flattering evidence of the extraordinary progress made by the sheep breeders of Prussia in multiplying and improving Merinos and mongrel-Merinos, in a comparatively short space of time, yet, on the other hand, it shows also how much there remains yet to be done, and that an application of proper remedies against the defects and disorders of Merino breeding is urged if it is to continue profitable, in accordance with the prices of landed estates, and the revenues derived from other branches of breeding domestic animals.

Those reports, fully confirming my own observations, show the following facts:

1. In those countries where the breeding of Merino sheep forms an important branch of agriculture—in Prussia, Posen, Pomerania, Brandenburg, Silesia and Saxonia—the vertigo prevails to a greater or less extent. The efforts made to subdue this disease hitherto have not been successful, and if a decrease of the evil is noticed here or there, its violence seems to increase in other localities. Pomerania is least afflicted with it, while the complaints of it are almost general in Silesia.

2. With the exception of Pomerania, where, under the influence of her own Negretti stock-flocks and of those adjoining Mechlenburg, Negretti blood preponderates, and exists partly in its pure form, partly predominates in a mixture with Escurial blood; this latter is predominant to a considerable degree in the eastern provinces. There we find the purest type of this race spread over a large territory, originating from the tendency in breeding formerly pursued in Saxonia, the partial aim of which has exerted a regulating influence upon the breeding of Merino sheep in most districts to the present day. In localities where, by intermixture or crossing, the development of intermediate forms (N.E.—E.N.—E.E.N., &c.), was furthered, satisfactory forms of body were obtained; but seldom was the stature sufficient to prevent overgrowth, in cases where the Electoral type

was conserved unchanged. There we hear most frequently complaints of the shortness of the wool, and in consequence thereof, of twisting.

8. In all localities where the breeding of the Electoral sheep in its purest race, or only in the first stages of its tendency to the Negretti type, meets with the greatest favor, the weight of the fleece is very deficient. Under such circumstances the flocks of whole districts average no more than one and a half to two pounds per head, and there are many flocks falling even short of that. This unfavorable result cannot be counter-balanced by the price of wool, for even there, where wool is very scarce, its price, on an average, rarely exceeds 65 or 75 thaler (Prussian) per hundred weight, (112 lbs.), in any one year, while the meat-market, being seldom remunerative, precludes the means of increasing the fallen profits of Merino sheep breeding, by fattening; that in any country where the production of wool constitutes the *chief* end of Merino breeding, there are individual flocks affected, but to a limited extent or not at all, by the above-named evils, is a fact too well known to need further comment; but it is also known to be a matter of fact that not only isolated Electoral flocks, but larger breeding districts, especially in the province of Silesia, possess the properties of fineness and nobility of wool in so high a degree that the average price of this product exceeds by far that above stated. Yet among the large mass of the total production, these form but individual instances which do not essentially change the survey of Electoral breeding yet spread so far.

I believe, therefore, that the above characteristic will prove correct in general, and now we may consider the question whether the application of Negretti blood is to be considered as an appropriate remedy for removing the defects named of Escurial breeding.

To 1. As to the vertigo, I can repeat only what I have said on another occasion, ("On the breeding of animals, p. 62, &c."), namely, that inter-breeding and incestuous breeding, carried on consistently through many generations, develop the disposition to vertigo the more decidedly and the faster, the more one-sided the breeder keeps his eye only on the condition of the wool, and disregards debility in the entire organism and approaching over-growth of certain parts of the body. In the above-named work I have also mentioned that yet other circumstances may co-operate and accelerate an outbreak of the disease, but always a long continued inter-breeding is to be considered the chief cause of an occasional outbreak of the evil.*

---

* Mr. Elsner von Gronow, at Kalinowitz, states the following fact, which is worthy of notice, and confirms my view. (*Annals of Agriculture*, 1860, p. 250):

"Ewe No. 480, born in 1823, presented, in connection with a very high degree of fineness, a weight of fleece of 3 pounds and 13 ounces, which was extraordinary at that time. In the

Although the breeder may be successful in using those remedies which are offered him, by removing the co-operating causes of the disease; although the keeping and feeding of the animals according to strict dietetic rules, the late admittance of the ewes, the sparing use of the bucks, and the exclusion of aged animals from all participation in breeding, may have favorable results, yet all these remedies will not exterminate the vertigo, if the breeder will not also determine upon an admixture of new, sound blood. The more vigorously this courses in the system, the surer his success is, and for this reason: The breeding of Negrettis tending, according to what has been said above, to the development of such a vigorous blood, will furnish the most appropriate material.

To 2. That the defects in the stature of the Electoral sheep, and the disposition to an over-growth of the forms of the body so frequently found, must be removed, and make room for more normal figures by crossing with the vigorous, well-built Negretti, is proved by experience, and must be acknowledged by the adversaries of the more recent tendency in breeding.

To 3. The breeding of the Negretti sheep also tends, by developing an appropriate form of body, to create not only a powerful animal not liable to over-growth, but also a spacious wool field; and to cover this all over with the most regular possible density is the anxious care of the breeder. He can not be bribed by the fineness, nobility, truthfulness and equality of the wool, if the quantity is unsatisfactory; and this, in connection with those properties, makes an animal valuable only when also the head, the legs and the belly are completely covered, and especially the latter with a sufficiently long and dense staple. Consistent adherence to these strict demands, and merciless rejection of animals not coming up to this standard, have created Negretti flocks whose weight of fleece astonishes the breeder of Escurials. Can there be any doubt that this blood is able to remedy the poverty in wool of the Escurial flocks, and to increase the weight of their fleece within a short time? Surely not, if we may answer this question, according to analogies in the science of breeding. Yet what could there be more decisive than facts for the case in question—successful experiments, proving *a posteriori*, that the proposed remedies will not fail. Here I will not refer to the above-mentioned reports of the agricultural societies, for although they confirm almost unanimously the fact of an essential progress

---

year 1838, therefore, it was determined to breed from her, and her two daughters nearly like her, a separate stock-flock; and to distinguish them from all other sheep of the flock, their tails were not cut off, and, besides, they were kept by themselves in a fold separate from the folds of the establishment.

In 1842 this stock-flock of very beautiful and vigorous animals, having great riches in wool, had reached the number of 50, when the vertigo broke out amongst them, by which disease they were all destroyed in the year 1848.

in obtaining heavier fleeces to be caused by an admixture of Negretti blood to Escurial flocks, yet, more generally, they furnish views and observations founded on instances proved by figures. We will consider the latter, especially such as are taken from flocks without sale of bucks, and are undoubtedly reliable.

"Since 19 years," says chief-bailiff Bleyer, in the Georgine, 1860, "I bred sheep; in the first 14 years I bred only Electorals, with the utmost care and attention, used bucks from other good flocks for whose wool was paid more than 100 thalers per hundred weight, and aimed chiefly at richness in wool, but I could not make any progress with my flock. Nevertheless I would force a progress, and kept ewes mostly, in order to have the choice of animals for my flock from among a numerous offspring. The very noblest animals, which undoubtedly would have raised the price of wool from 100 thaler to 115 thaler per hundred weight, but could not bear the food, pasture, and climate of this locality, were killed at their birth and given to the dogs; and besides, of 500 lambs that were sold every year, about 100 head at 20 to 25 silver groshen, having the signs of sparceness in wool, red ears, bare heads and feet. During the past 16 years my shepherd had free access to the oats chest for lambs, which, of course, had to be stopped in the last three years; yet the progress in my flocks remained very trifling until the so-called Negretti swindle.

"But in the 5 years during which I used mongrel bucks,* (as they are named in the above mentioned essay,) from three Mechlenburg flocks, I have progressed not step by step, but by double-quick step. Now I have not to kill the lambs at their birth, or sell them at any price, for there are amongst six hundred lambs hardly six which are not very beautiful and powerful animals.

"Since 16 years, my flock averaged, at a price of wool of from 63 to 80 thaler, from 50 to 65 silver groshen per head, while in the last two years, the price of wool being only 67 to 76 thaler per hundred weight, it brought 3 thaler 5 silver groshen and more per head; and I confidently hope that, if no particular misfortune happens, the yield will be much larger next year."

The following is an extract from the report on the exhibition of sheep at Pesth, from the 3d to the 6th of June, 1860, by Fr. Matthœi. (See Agronomic Journal.)

"Before we proceed to the sheep of pure Hungarian breed, we beg leave to mention a cross of Rambouillets and Merino sheep exhibited by Messrs.

* This refers to the objection so frequently made by the adversaries of the Negretti blood, namely, that the Mechlenburg flocks consisted chiefly of Mongrels, and could, therefore, not be qualified to furnish animals for breeding to improve other flocks.

V. Benitzky and Von Mocsary, which produced the most astonishing results, and proved, in the most striking manner, the power of transmission in the first named race, which has been much admired, as well as virulently attacked. The case is interesting, because the flock, of which these sheep are descendants, was bred for a series of years, in a method aiming at fineness of wool, and the yield of wool was thereby so far reduced that those sheep averaged only one and one-half pounds, while the productions of this single crossing, the two years old ewes yielded at least three and one-half pounds, the wethers four and one-half pounds, without showing any considerable loss in the fineness of the wool. The frame of body increased as much as the yield of wool."

Such simple, evidently truthful communications of impartial men are of great value, for their statements of facts furnish so striking proofs as not to admit of any doubt.

Above we have tried to trace the defects of the Electoral flocks back to three cardinal points, and in the course of our investigation we have seen that the Negretti blood is qualified to furnish the material for removing the defects of those flocks; and, therefore, it would seem that the breeders of Escurials cannot do any better than to secure, by crossing, all the advantages likely to result from this method of breeding, yet we see that comparatively but few determine to pursue this new way with decision, that others delay and consider the matter without coming to a determination; and lastly, that a small, but powerful party dissuade from such a course, depicting the method proposed for improving the breeding of Electorals as erroneous and pernicious.

We leave the wavering to their deliberations without expostulation, for their passive resistance frequently originates from a lack of energy; they have an eye upon the end, but void the means.

But we have to pay our full attention to the views of those breeders who advocate the cause of Electoral breeding, being convinced of the correctness of their opinion, who are not personally interested as sellers of bucks, but who, in the interest of the breeding of Merino sheep and the production of wool in Germany, deem it their duty to warn against the dissemination of the Negretti blood and its use as a means for improving degenerated flocks.

The charges made against the Negrettis, and the objections raised against using them for breeding purposes, may be fully comprised in the following points:

I. The Negretti sheep, and among them especially those of Mechlenburg, are to be considered as more or less mongrel, and, therefore, they afford no surety of transmission, and their ability of transferring their properties upon their descendants is not satisfactorily tested.

II. Negretti blood and Escurial blood are heterogeneous elements to such a degree as to preclude the possibility of creating, by their crossing, a homogeneous production satisfying the demand of the breeder.

III. The Negrettis bear card-wool, and as the production of cloth-wool is and will be the chief end of Merino breeding in Germany, they cannot be considered an appropriate material for breeding, particularly as

IV. The Negretti blood lacks the noble wool fibre, so that an admixture of the same to the noble Merino flocks of Northern Germany would cause the loss of the "golden fleece," the proud acquisition of the breeders of many regions, and of the reputation of the animals for breeding, and the price of wool in those regions, which again would reduce the profitableness of sheep breeding.

V. If the weight of the fleece of Negretti flocks actually should be so heavy as their breeders state, (which is still doubtful,) yet they furnish smaller net revenues than the Escurial flocks not as rich in wool, because the latter require less food, are contented with an inferior quality of the same, are less assuming in general, and produce a more valuable wool.

We will consider each of these charges or objections separately, and inquire whether and how far they have a foundation, and ought to be examined.

To I. *That mongrel blood is less transmissible than pure blood*, is yet to be shown.

The school of the theory of race and constancy to whose dogmas also this assertion belongs, has not been able to prove it, while the doctrine of individual potency, by the aid of criticism, has arrived at the conclusion that, in general, the power of transmission is as reliable and inherent in mixed blood as in animals of pure blood, but that, in particular, the degree of this power is conditioned by the organism of the individual, independent of its pure or mixed blood, so that not the race, the breed, or the blood in itself, but only its test as what it may accomplish in breeding, can determine the degree in which the individual possesses the power of transmission. If the term "Mongrel Merinos" comprises sheep in whose veins the blood of northern country sheep may be shown to course, in a larger or smaller proportion, then, according to the above stated doctrine, the power of transmission would be inherent in such mongrels, in no less degree than in animals belonging to Merino flocks of pure blood. If, here and there on exhibitions and sheep marts, Mechlenburg sheep presenting, in their forms of body, the type of the Negretti sheep, have not been appreciated, but as breeding animals, have justly been considered wholly inappropriate for certain purposes of certain breeding districts, it happened

not because they were *mongrels*, but because they did, by themselves, not meet the demands and present wants of those localities.

Besides, I have shown above that a large proportion of the Negretti sheep of Mechlenburg and Pomerania belongs to Merino flocks of pure blood, at least so far as their evident descent from Merinos imported directly from Spain may prove it, and be considered a criterion of pure blood. But such a guarantee is of very little moment, for, on the one hand, it is probable that the Merino race originated in very different compositions of blood; and, on the other hand, it is more than probable that yet at that time when Merinos were imported from Spain into Germany, many of the flocks of the former country were any but of pure blood. Before the devastating wars of which Spain was the theatre, in the second half of the last century, that country is said to have possessed 18,000,000 of sheep, about one half of them being Merinos, and the other half country sheep and mongrel Merinos. "According to Labordes, this number was reduced to 5,000,000, according to other reliable reports, to 2,500,000; and since, on their flight, in order to save the flocks from the enemies, Churros, Metis, and migratory sheep or original Merinos have often mingled and mixed. Many owners of flocks are said to have lost their pure blood in this way."

Therefore, it is very probable that among the Spanish sheep imported into Germany, also there have been such as originated in commixtures of blood of the most recent times; and this probability even becomes a certainty in the case of a portion of the animals imported thence, for according to the reports on this subject, preserved to this day, there can hardly be any doubt that the ewes and bucks taken in the year of 1778, from the flock of the Countess Cuenza, and incorporated in the State stock flocks of Saxony, were Mongrels, and even very poor ones.

Further, if we take into consideration that a large portion of the formerly and now yet so renowned stock flocks of the kingdom of Saxony,* and further, that flocks like those of Kuchelner and Moeglin,† having an extensive sale of breeding animals for a series of years, that they all have received, and drawn into the process of amalgamation, the blood of northern country sheep, we cannot but be convinced:

First, That there exists in Germany very few Merino flocks which may be considered as being of pure blood, and in which an admixture of Mongrel blood may not be shown.

Second, That the power of transmission cannot be denied to mixed or mongrel blood, because otherwise it must be wanting also in most of the

---

* See Elsner, Review of improved sheep breeding in Europe.

† See Doctrine of individual potency, &c., by Settegast.

stock flocks which proved perfectly reliable as to the power of transmission in their breeding animals.

Third, That the objection that the Mechlenburg Negretti sheep, as mongrels, cannot safely transmit their properties, and, therefore, are unqualified to improve the Escurial sheep, is unfounded.

Hoschtitz, Kuchelna, and Moeglin, may justly be considered full-blood flocks. Hoschtitz is also a flock of pure blood, in so far this may still be determined according to the above; but the blood of the Kuchelna and Moeglin flocks consists of multifarious mixtures.

To II. *Negretti blood and Escurial blood are heterogeneous elements to such a degree as to preclude the possibility of creating, by their crossing, a homogeneous production satisfying the demands of the breeder.*

That a combination of heterogeneous elements can be accomplished in the breeding of animals, in general, and is not merely a mechanical mingling, as the school of the race and constancy doctrine maintained, I have shown in my "Essay on the Breeding of Animals," and I may be permitted to refer to the same. But whether such a combination, the feasibility of which cannot be doubted, be commendable; or whether the properties the combination of which is aimed at in their connection and mutual proportion, will accomplish the ends of the breeder, or meet the wants of agriculturists, is quite a different question; and to answer this question, in each special case, must be left to the judgment of the breeder.

To avoid a misunderstanding, I may be permitted to illustrate the above by an instance:

Among the numerous races of the dog, there are hardly any greater differences than those presented in the forms of the Grey-hound and the Bull-dog. Is it possible to bring so heterogeneous elements into harmony with each other? The old theory answers this question in the negative, reasoning *a priori*, that only a mechanical mingling can originate from the combination of the blood of these two races; the new theory answers in the affirmative, relying on analogies, yet the affirmative answer in itself does not commend a crossing of these two heterogeneous races, for of what use could it be, the Grey-hound as well as the Bull-dog being each by and for himself an excellent animal for special purposes. But now the hunter observes that his Grey-hounds do not show themselves as excellent on the chase as formerly; that they do not lack velocity, but courage and perseverence in pursuing the hare, and consequenly will soon desist from the chase. What was useless before, becomes now desirable; the crossing of the Grey-hound with the Bull-dog becomes the means of imparting to their posterity, by returning, in the process of breeding, to individuals of the Grey-hound race, that courage, the decrease of which threatened to make

the pure breed worthless. This process of crossing, this combination of elements than which more heterogeneous ones can hardly be imagined, was initiated by Lord Oxford, and at present it is frequently adopted in England for the purpose above stated, and always with the same complete success.

We return to the types of the Merino sheep, whose closest possible union now engages our special attention. We will not deny that the Escurial sheep, formerly at home in Saxony, and bred after the Saxonian model, almost throughout all Germany, is, as it were, an antipode to the Negretti sheep, and that the forms of these two races are heterogeneous to each other; but, on the other hand, it must be admitted that the defects of the one race may be remedied or made up by the superior properties of the other, the evidence of which is given above. Accordingly, we would choose, without delay, the material offered for the improvement of the defective material, if the "theory of the race" did not cause us to hesitate. This doctrine positively rejects a combination of these elements, *first*, because the pure races would perish thereby, and such commixtures would keep us in a permanent chaos;" *second*, a close connection could not be effected but only a mechanical mingling.

This school has not pursued the inductive method in establishing its doctrines, but had applied it only in a special case, and tried to base their doctrine upon a supposed fact. They maintained (see On the Breeding of Animals, by Settegast, p. 49, and On Individual Potency, by the same author, p. 15,) that the crossing between Electorals and Infantados (Negrettis) produced *mongrels*, without homogeneity, and that the attempts to effect, in the productions of the crossing, a close combination of the properties of the wool of these two races had failed, but that the hair of the one or the other race predominated, now on this part, and then on that part of the body, or that even the most different forms of staple, without any equality, stood in medley beside each other. This observation is not confirmed by facts; on the contrary, the results of all the experiments made hitherto prove that it is easy to effect, even in the first generations, a close combination of the characters of the wool of these two races.

One of the most momentous events in the history of Merino breeding in Germany, is the establishment of the stock-flocks of Prince Lichnowsky, at Borutin and Kuchelna,—in regard to their origin as well as to their extensive and effectual influence upon the formation of other flocks. That they owe their foundation to a crossing between Negrettis and Electorals; further, that soon after the execution of this measure of breeding they gained a high reputation, their marketable breeding bucks found a rapid sale at high prices, and the wool of these *mongrels* was praised by all man-

ufacturers, and bought at high rates,—these are fixed facts, for which the history of Merino breeding furnishes the most reliable data, and which I have stated repeatedly. I might mention many similar instances in the history of the breeding at the present time,—might point to the happy results derived, among other cases, at Moeglin, from an admixture of Negretti blood to the Saxonian Electoral stock,—but all such instances are of little importance, in comparison with the most striking and reliable evidence of the process at Kuchelna. Should we have learned nothing by it? Should we forget all successful experiments made there? Should we, in spite of such striking results, adhere to the doctrine, that heterogeneous elements are incapable of being closely combined, merely to uphold a school. The consequent assertion, also, that Negrettis and Escurials are too strongly opposed to each other to give the breeders any hope for happy results from their crossing, is no more tenable than the above doctrine in general. Let us, therefore, forget that doctrine, and, where it is necessary, improve our Electoral flocks by Negretti blood.

To III. *The Negretti bear card-wool, and, as the production of cloth-wool is and will be the chief end of Merino breeding in Germany, they can not be considered an appropriate material for breeding.*

We will admit, and we must accede to the opinion, that in districts where a depressed meat-market does not offer any inducement to the breeder to develop chiefly those properties of the sheep as make it more valuable to the butcher, or where the Merino sheep is almost exclusively, or at least chiefly, valued as a wool-bearer, the production of a good cloth-wool will be more profitable than the production of card-wool; but, more recently, the latter has become more and more extensive, for not only has it found favor with breeders in those countries where the value of the animal is to be taken into consideration, or forms the chief point by the butcher, but it is favored also in transmarine countries. The produce of card-wool in Germany, therefore, will then only be able to stand the depression in the prices of wool caused by competition, when the prices of meat are not so low as to deprive him of the chance to make up amply for his loss in the sale of wool, by improving the fattening propensities of his breed, even to such an extent as to pay less attention to the quality of his wool. The particular points required in a good card-wool are more easily attained than those expected in a good cloth-wool, and, therefore, the breeder will rather produce the former, especially if he tries to improve his Merinos as animals most acceptable on the meat-market.

On the one hand it is foreseen, that as the wealth of a nation increases, and the meat-market becomes more remunerative, the tendency just men-

tioned in breeding will also become more general; but, on the other hand, there are very extensive districts in our country where, for the present, and evidently for a long time to come, the state of the meat-market will not present any inducement to the breeder to take any steps toward improving the fattening propensity in his sheep, which might cause a decrease of his income from the sale of wool. Thus, in those districts where the sheep excelling in wool maintains its ground undisputed, there the production of a *good* cloth-wool will be in its place, for its territory is more limited, and need not fear any considerable competition from districts chiefly producing meat, or from transmarine countries and colonies.

Yet the breeders in our country, who follow or are compelled to follow this tendency, can only compete with those who breed with a tendency towards the production of meat and card-wools, and realize as much as these in proportion to the food consumed, if their efforts are directed towards obtaining a heavier weight of fleeces, than may be expected by the breeding of Escurials. These efforts should tend not only to create, by increasing the size of the body,—a most spacious wool-field, a complete cover of the sheep, and strong and dense wool,—but also, in connection with these points, to give the staple the greatest possible length, since the other qualites being equal, the longer wool will make the heavier fleece. To what extent an increase of the mass should be effected by lengthening the staple, is definitely prescribed by the purpose pursued in breeding: if it is the production of a good cloth-wool, the staple may be lengthened to that limitation, beyond which it no longer meets the demands of the manufacturer, and can not be considered a valuable article. This limitation is confined to a length of between one and a half and two inches of the unwashed wool in its natural growth. It will be the task of the producer of cloth-wool to reach and maintain in his whole flock the greatest possible uniformity in this hight of the staple, defining the growth of any one year. Breeders of Negretti sheep have made efforts of this kind, and this is praiseworthy; but why this race is identified with Merinos bearing card-wool, is not shown. The faculty of producing a long wool is no more the property of the Negretti than of the Escurial race; and thus the Negretti sheep will bear card-wool only when its breeder designs it, and this is not the case under all circumstances. So we find, indeed, a large number of Negretti flocks producing, undoubtedly, no card-wool, but, according to the breeder's design, bearing cloth-wool, and of such excellent quality as to be an article sought after and bought at a high rate on wool-marts.

It is certain that the Negretti race includes also card-wool flocks, of which some are worthy of particular notice; but the assertion that every Negretti sheep bears card-wool would show a want of practical knowledge of

the subject. The above mentioned Negretti flocks of Mechlenburg and Pomerania refute this opinion most decidedly. Hoschtitz produces cloth-wool, and so do Keuzlin, Weisin, Passow, Lenshow, Klempenow, &c., and chiefly against these flocks the above objection is made. Here the evidence is furnished that the most decided breeding of Negrettis is as compatible with the production of excellent cloth-wool, as with all the good qualities of the wool-hair collectively, which, in the contention—whether Negretti or Electoral—have been comprised in the term of the "Golden Fleece."

This, as the *fourth* of the above stated objection alleged, is said to be jeopardized by the intrusion of the Negretti sheep, and that the breeder of Merino sheep in Germany may be apprehensive of losing the honor of bringing to market the most excellent wool of the world, and that he undermines the profitableness of Merino breeding, if he should voluntarily give up all the advantages derived from his master production of the noblest wool, the "Golden Fleece."

In order to investigate whether this apprehension uttered by patriotic men is well founded, the first thing necessary will be to obtain a full survey of the extent of the blessings which have resulted from the possession of the Golden Fleece.

The interests of industry which the breeding of animals, as a branch of agriculture, ought not to disregard, forbid that the honor and the glory of bringing, in respect to quality, the most excellent article to the marts of the world should rule and characterize the production of Merino wool; these properties, invaluable in respect to morality, are to be considered valuable, in respect to industry, and may fill our hearts with just pride, only when they are accompanied by material advantages and sure profits at which more modest efforts will aim. Thus, the loss of the honor of being entitled to call the Golden Fleece exclusively our own would appear deplorable, only when the breeder of sheep should lose his revenues together with the glory.

Then we have to put the question how is it with reference to the Merino breeding, and with the realization of the feed consumed, in those districts where the Golden Fleece has been cultivated as long as the new race has been introduced, where the breeding of the Electoral sheep in its purity has been kept up to the present day, and the Saxonian productions of fine wool, of glorious memory, formed the ideals of the producers? If we may rely on the above mentioned reports on the state of the breeding of Electorals, which the agricultural societies were kind enough to send me, and which treat on the subject with great and laudable candor, I cannot say that the answer to this question gives any reason for being sat-

isfied with, or proud of, the results derived from the efforts of half a century.

From those communications, with which also my own observations agree, I learn that, in the largest portion of the Electoral districts, the points on which the revenues of the producers of wool depend—the weight of fleece and the price of wool—are anything but satisfactory. Everywhere they complain of the poverty in wool of the sheep, so that in many flocks no more than an average of 1½ pound per head is shorn, while it is considered an extraordinary case if a flock yields 2½ pounds per head. And now, how are the prices? The market reports of Berlin, Posen, Landsberg, Koenigsberg, Magdeberg, and other cities, whither most of the Electoral wool is brought, show, and the producers will surely admit it, that the average prices paid during a series of years are not in proper proportion to such a small weight of fleece, and, on the whole, they are so low, that the simplest calculation must prove the revenues derived from this method of sheep breeding to be unsatisfactory under the present junctures. During that period, when the process of real estate were only half as high as now, when the sale of other animal productions in our country was more difficult because good roads and facilities of commercial intercourse were wanting, the realization of the materials used for feed by the production of Electoral wool, the revenues just alluded to being no higher, may have been satisfactory; now it is so no more.

Here we must ask, what then do we surrender when we, pursuing a new way, and by adopting the leading views of Negretti breeding, endeavor to raise the sunken profitableness of Merino breeding? The answer is: the approbation of the manufacturer and the high prices paid for Electoral wool.

As to the approbation of the wool merchant and the manufacturer, as remarked above, it certainly can have no ruling influence upon our industrial operations, but only when it affords material profits, and the Golden Fleece is proportionately balanced with gold. Hitherto this seems not to be the case; but, on the contrary, the collective yearly reviews of prices paid on German wool marts, at least give evidence that they are not in proportion to the small weight of fleece. So long as the quantity of fine Electoral wool, especially suitable for the manufacture of cloths is as considerable as at the present time, the price of the article will be depressed, and will not meet the demands which the agriculturist has to make, in order to find in the higher prices of his product a full remuneration for the loss in the weight of fleece he incurs by the breeding of Electorals and favoring the manufacture of the cloth. The mass of the fine and finest cloth-wool at present glutting the domestic markets must yet considerably

decrease, if the manufacturer shall be compelled by competition to allow such prices as will correspond to the expenses of its production and the revenues now-a-days derived from other branches of the breeding of domestic animals. Who would blame the manufacturer, if he, when asked for his opinion on this subject, describes the present condition of the production of Electoral wool as sound and commendable? In this way the agriculturist may obtain information as to the greater or less value of the articles, and avail himself of the same in his operations as a producer of wool; but from this source he cannot expect any suggestions which are calculated to further the interests of the producer, and to lay a permanent foundation for the breeding of Merino sheep, by making it more profitable, or which, even in the least, might compete with the advantages the wool merchant and the manufacturer derive from the present state of the market. This is so natural that we cannot attach the least blame to the manufacturer who has first to secure his own interest and, in his speculations, to regard the profits less of the sheep breeder, if he, as far as his influence may go and his opinion prevail, endeavors to keep the producer in such a course as proves most favorable to the manufacturing interests. Thus as to questions where the advantages of the manufacturer do not go hand in hand with the industrial demands of the producer—and that there are such questions is undeniable—the former will not be found to side with the sheep breeder, and it is not to be expected that he will approve of efforts calculated to obtain a heavier weight of fleece, by favoring the Negretti blood. He sees clearly the danger threatening him by a decrease of the quantity of Electoral wool which hitherto could be had at proportionately low prices, mostly by contract, in the provinces of Silesia, Posen, Brandenburg, and East and West Prussia. By an average price of about 70 Thaler per cwt., and a weight of fleece amounting to about two cwt. per hundred sheep, it is evident that from a method of breeding courting the favor of the wool-merchant, there cannot result anything other than a realization of about six silver groshen a cwt. of hay;* but that the sheep-breeders cannot be satisfied with so small a profit which, not unfrequently, is still less than this, will not change the views of the manufacturer in regard to the profitableness of the present state of affairs, as far as his own intererests only are concerned.

I may be permitted to quote here the opinion of a man whose authority in affairs of Merino breeding is generally acknowledged. In a letter to myself, Edward Kunitz speaks as follows:

---

* See further particulars in the essay: A word to the sheep-breeders of Prussia, by H. Settegast. Agr. Journ., 1854, p. 131.

"In this way many, very many millions of money have not been realized, because the producer sought the honor and glory of his flock solely or chiefly in the highest prices per cwt. of his wool in market. The miserable average yield per head of the flocks, in spite of the highest prices per cwt., even where the local circumstances and an abundance of feed are able to produce a great mass of wool, would seem incredible."

After we have seen how far the approbation of the wool-merchant may influence our measures as breeders and producers, these words lead us to the *second* advantage which, according to the above-named objection against the Negretti blood, is said to stand or fall with the breeding of Electorals —the high prices of wool allowed the admirers of the Golden Fleece.

We know, and it is evident from the market reports, that the great mass of Electoral breeders in the eastern provinces of our country do not participate therein; consequently what is cultivated there cannot be the Golden Fleece, because light weights and low prices cannot be connected with this promising term. But where, we must ask, is the treasure to be found? Let the blessed country, the identical *Colchis*, be named; for all Merino-breeding Germany is said to be the very land, but our observations show that she is not.

The Argonauts point to Silesia: there the identical Golden Fleece is said to be at home, which, they assert, does not only crown its possessor with honor and glory, but also brings real profit, and promises permanent remuneration. There, then, we have to look for it.

Every connoisseur of wool, every breeder of Merinos, must contemplate the production of that country with the greatest satisfaction and gratification. It is true the uniform fineness, combined with this power of the wool, with this nobility, with all those properties which make a wool-fibre so valuable for the beautiful texture of cloth, can be found in this perfection and to this extent in Silesia alone; and that the breeders there are proud of a product with which no other region can compete, and which may be entitled to the name of "Golden Fleece," is perfectly justifiable.

With whatever reverence I might speak on this occasion, of the accomplishments and successes of Silesian sheep-breeders, I could repeat only what I have said in the treatise. "Sheep breeding in Silesia," (see archives of agriculture in the Prussian monarchy). But if we inquire whether this pearl in the wreath of the various branches of the breeding of animals in our country can maintain its integrity only by excluding the Negretti blood, we must observe that the latter can not possibly be considered an element inimical to the Silesian "Golden Fleece." We know by the history of its origin that it is a production of a cross between Electorals and Negrettis; further, we know that the blood which courses in the veins of

the Negretti flocks of Mechlenburg, and many kindred flocks of Prussia, is near kin to that which was used at Kuchelna, the place to which the noblest Silesian flocks owe their origin, in creating a new race—Escurial-Negretti. Then, in the face of facts and events for which men still living give evidence, and of which we possess most reliable documents, how can the assertion be maintained that the Negretti race will have a pernicious effect upon the nature of the Electoral wool-hair, will "Mechlenburgize" it? The superiority of the flocks of Prince LICHNOWSKY was attained by a lucky experiment—by a crossing of these two races. Why should not a similar success result from a similar process, and what danger could be apprehended from a repetition of the same, after the experience made there has decided in favor of this mixture of blood?

We may go still further and assert that the development of the Golden Fleece of Silesia has kept even pace with the favorable reception the Negretti blood has found in the new race created by and derived from composition. This is shown by the most excellent flocks of that province, in which we often meet with pure types of Negrettis, endowed, besides with so superior properties of the wool-fibre, that hardly any thing better could be desired.

On the strength of the evidence derived from the above statements, we arrive at the conclusion that the objection is unfounded, that the Golden Fleece of the Electoral flocks would be injured by the use of Negretti blood, and that by the deterioration of the wool, glory, honor and revenue would be lost.

As to the question whether, according to the prevailing junctures and prices of estates, it would be advisable for the producers of wool in Silesia to add, if not to the splendor and intrinsic worth of the Golden Fleece, yet to its weight, the decision may safely be left to the deliberations of the breeders there. The high intelligence predominating in their circles, and the active attention paid there to any subject touching the breeding of sheep, prognosticate that the controversies occasioned by the contention for the Golden Fleece, will have their effects. The superior, powerful minds which for a long time developed an energetic activity on the field of breeding noble sheep in Silesia, justify the expectation that that sacrificing passion which spares no pains and labor, and which is an indispensable attribute of the breeder, if the fruit of his endeavors shall rise above the modest efforts of mediocrity, will receive a new impulse from the discussions of the various opinions. To stop and rest on one of the steps toward the pinnacle of mental or industrial progress, indicates impending retrogression. This will not happen to the production of wool in Silesia if the breeder, as he has done hitherto, will further endeavor to conserve the excellencies of the fleece, and to uphold the vigorous organism of the animal, and to restore it when it becomes debilitated. Then

Silesia will again secure that considerable revenue which the breeder derived from the sale of animals for breeding during several decennaries, making other provinces, as well as a large proportion of foreign countries where Merinos are bred, tributary to the native country of the Golden Fleece; and large sums now turned into other channels will come back thither. This loss is considerable, and is to be deplored by breeders and patriots, in so far Silesia's loss enriches Mechlenburg. But if we are not mistaken, the way for remedying this has been opened. It appears the sheep breeders of Silesia perceive that the love of the Golden Fleece, if it becomes a passion, and does not embrace the vigorous and powerful animal itself, must lead him astray. "Beneath palm trees no man walketh with impunity." The excellencies of a breed raised to the highest pitch may, in the long run, be considered a valuable acquision only when the organic constitution endures, and the original powerfulness of a robust body is not undermined by the constant effects of incestuous breeding. In this respect I am of the opinion that the principles of Negretti breeding, as I have tried above to illustrate them, if judiciously applied under the junctures prevailing in Silesia, will confer a blessing upon the Golden Fleece there. The revival of blood to which the breeder must consent, will detract nothing, or at least nothing essential from the gold; it will effect an alloyance which, by its greater power of resistance, proves more suitable for practical life than the pure metal.

Now, the last objection—the fifth of the above-stated charges—is yet to be examined. It is asserted—

1. That for Negretti wool much lower prices are paid than for Electoral wool in the corresponding assortments.

2. That the quantity of feed requisite for Negretti sheep is so large that, in spite of the heavier weight of their fleeces, the production of wool, by Electoral breeding, is less expensive.

Of the prices of electoral wool, I have spoken above; if the Silesian product and some isolated articles of the highest nobility produced in other Prussian provinces are left out of the calculation, they are, in the average, low enough indeed, and afford no reason for advocating the breeding of Electorals.

Here we must again deny that the Negretti race does not give the breeder the means of producing a valuable wool endowed with excellent properties, and sold, according to existing conjunctures, for 80 to 100 Thalers, and even more. Yea, we can not even admit that the breeder's task of giving the fleece all the properties distinguishing a good wool, is facilitated by the Electoral race; for although we will not deny that a fineness of wool belonging to the higher sortments is soon attained on thin-skinned animals,

yet this is the case only when this property is aimed at alone and one-sidedly. But there is not much gained, for the finest wool is not the best, and to make it truly valuable a number of other properties must be added, among which durability (nerve, strength, solidity) is the principal one. If the breeder of Electorals does not neglect to pay proper attention to this sum of properties, and to cultivate each of them without any predilection, then any favoritism as to the material offered by the Negretti race ceases, and to attain a cumulation of valuable properties is no more or no less difficult in the one case than in the other.

Here it might be asked, How then is the fact, that chiefly the Electoral and kindred flocks furnish the manufacturers of cloth with the most excellent and dearest wool, to be explained in any other way but that it is more difficult, and perhaps impossible, to attain the same object by Negretti breeding? We can easily answer this objection, and show the fallacy of the assertion that the generality of the efforts is valued according to the above, if the breeding of Negrettis does not meet the highest demands in one or but few directions. The more extensive the series of demands made of an animal, or of a race, the less rigor we must evince in the judgment of individual points. The breeding of Negrettis, as long as the production of wool is its *principal* object, and the value of the animals to the butcher is a point of less importance, will, like the breeding of Electorals, produce a fine, equal, true, noble and powerful wool, but at the same time in large quantity upon a robust body, preventing any overgrowth. It willingly renounces the honor of bringing the dearest product to market, and, keeping aloof of any one-sidedness in its efforts, it directs its attention equally to the points which will permanently secure the profitableness of Merino breeding. But that the breeder of Negrettis is able to reach, if not the highest pitch of nobility, yet such a grade as even the breeders of Escurials must acknowledge as a favorable result of efforts aiming at fineness and nobility of wool, is proved by the flocks above-mentioned.

Now, having answered the first point of the objection as to the quality and price of the Negretti wool, and turning to the question what quantity of feed is requisite for individuals of the one or the other race, I may be permitted to remark that, as the contention for the golden fleece was not brought to a final decision, this point also was not fully illustrated. An occasional report stated that the animals of a Negretti stock-flock in Mechlenburg received, on an average, an equivalent of four pounds of hay per head during the winter, and as the other party estimated the quantity of feed during the winter required by Escurial sheep at an equivalent of two pounds of hay per head, the conclusion was drawn from these state-

ments that the Negretti sheep in general, and the Mechlenburg flocks in particular, require twice as much feed as the individuals of Escurial flocks.* This conclusion, certainly, is incorrect. First, the above estimate of four pounds of hay as the requisite winter feed for a Negretti sheep is taken from a stock-flock having an extensive sale of animals for breeding, but such a flock can not be considered a reliable basis for calculating the quantity of feed requisite for the race, because the principles governing the feeding of such flocks are different from those governing the feeding of flocks from among which no animals are sold for breeding, and whose principal revenue is derived from the sale of wool. A stock-flock which shall attract and captivate purchasers must contain, first, excellent animals for breeding; and, second, make that pleasing and even charming impression which well-fed animals will never fail to make. This most necessary requisite, the result of opulent feeding, which gives the appearance of youthful freshness even to older animals having long remained in the flock for breeding purposes,—this requisite, I say, can not be overlooked by any one who has closely observed the management of a renowned stock-flock, and there can be no doubt that the rations of stock-flocks, in which the grains surely taking effect are of great importance and are never missing, can not furnish any information as to what quantity of feed is required, by an economical management, in order to keep the animals, as our venerable Kappe most pertinently expresses it, in the proper *husbandly* condition. The remedy to make the body as well as the fleece of every individual in the flock appear in the most favorable light, by giving them plenty of nourishing feed, is resorted to wherever the sale of bucks is a paying business; and it is known in Mechlenburg as well as in Silesia, that this end can not be accomplished by an equivalent of two pounds of hay per head. The puzzling question often put by customers to the managers of stock-flocks, What feed, and how much of it is given to the sheep? is hard to answer, and is frequently evaded. The answers are very different, and seldom satisfy the questioners; as, for instance, the classic reply of a Silesian breeder: "My sheep receive enough to be filled!" which is both cautious and candid.

I do not believe that there exist any considerable differences in the quantity of feed required by different stock-flocks, they may belong to the Electoral or to the Negretti race; neither can I accede to the opinion that, under ordinary circumstances when the sale of animals for breeding is not made a business, the Negretti sheep requires stronger feed than the Electoral. Here, of course, I presume that the individuals of both races are almost

---

* I repeat that here, and in this whole essay, I consider "Electoral" and "Escurial" to be synonyms, and use them as such.

equally noble and thoroughbred, although their peculiar properties may be different. It might be kept in mind that the breeding of Negrettis moving, with all its demands and necessary presumptions, within a cultivated race, will lose its ground, as soon as the breeding, keeping and feeding of the animals do not satisfy the demands always made by a race, to which we may apply the epithet "thoroughbred," until a better name shall be found. Under circumstances where these demands can not be satisfied—in the first stages of agricultural development, where the elements necessary to make noble animals thrive are wanting—where such animals are desirable as are frugal and insensible of any injustice done them, and which, from generation to generation, learn always better to bear hunger temporarily or permanently, without entirely stopping their scanty yield—there is not the place for the breeding of Negrettis, but neither can the noble Electoral sheep thrive there. Either of these races placed in such a condition will lose its peculiar properties, and, sinking lower and lower by degrees, they become at last a nameless and raceless rabble. For such circumstances which still prevail here and there, and can not be changed at present, the modest Merino sheep will maintain its importance, because it will always produce enough, in proportion to the attention and feed it receives, if it does not perish in wet years, to which it can not become accustomed. We should flatter these animals, but insult Saxonia or the Spanish convert, if we would number them among the Electoral or Escurial race on account of their little bit of *hunger*-fine wool. If we should create them a race, and were at a loss for a pertinent name, it would seem most approprate to baptize them "Hunger race," or "Escurial race," if the latter should not be offensive because of its similarity with the honorable "Escurials."

Agriculture is further developed, feeding materials are augmented in the same proportion, and the object of keeping sheep is changed, namely, to effect an adequate realization of the agricultural products of which a copious measure may be bestowed upon the breeding of Merinos, in other words, to select a race which is distinguised not by its capability of bearing hunger, but by its ability of paying amply for the feed it receives. Now, then, the breeding of Negrettis enters upon a competition with the breeding of Escurials; now the questions arise, which of these two thoroughbred races shall be chosen, be it for breeding them in their purity or for crossing; which, if any, differences have been observed in the quantity of feed required by either? Here I reiterate what I have said above, namely, that, without regard to such unessential differences as are conditioned by the individual character of some animals, by the different weight of the individuals of this or that flock, &c., the assertion that the Negretti

sheep requires more feed than the Escurial sheep, on a general average, cannot be maintained. But this holds good only under the condition and presumption that the Escurial flocks in the full possession of the peculiar properties of this race, is free from overgrowth, which seems not frequently to be the case, especially where inter-breeding was carried on, and, by secluding the flock, incestuous breeding approached nearer and nearer, or was even favored, according to principle. Merino sheep overgrown or disposed to overgrowth do not hold out well and require much feed; and, therefore, it will be observed that the requisite quantity of feed will be less, when the place of such a flock is occupied by another of the same number belonging to the Negretti race, or when the constitution of the posterity is invigorated by the use of powerful bucks and the admixture of fresh blood.

The experience of Mr. BLEYER-FRIEDRICHSBERG whose communications on the breeding of Negrettis and its results, as shown above, (Georgine, 1860, IV. number IV.) confirms what I have stated. He says:

"The Negrettis possess an essential point of superiority by their feeding much easier and better than the Electorals; with me, they have to be satisfied with the same pasture, which has been poor enough during the last two years, and they certainly are in better condition than the Escurials."

When the Escurial flock is not affected by overgrowth, even in the first stages, and we have to deal with vigorous animals, then, I reiterate, their keeping will require no more and no less feed than the keeping of Negretti sheep. Hereby I express not an opinion based merely on hasty observations, but it is my full conviction derived from experiments made in the feeding of flocks of both races. The manor at this place possesses a small Negretti flock, comprising about 300 head, to which several Mechlenburg flocks have contributed, whose wool was sold, for the last five years, at an average price of 85 Thalers per cwt., and which yields an average weight of fleece of about 3½ pounds custom-house weight per head, *including the lambs.* The requisite feed per head is calculated at 1.85 pound of dry substance, at a proportion of nutritious matter like 1:5.

When I compare herewith the quantity of food required by flocks of the Escurial race, if the animals shall thrive and keep the estimable character of their wool, then I do not find that a smaller quantity than the above given would suffice to feed them; nay, my own experience and numerous feed-tables from other establishments, made out with scrupulous accuracy, prove that every well fed Escurial flock which is managed according to correct economical principles and receives proper attention, shows a consumption of feed approximately corresponding to the above stated ration.

I wish that I might have been successful in illustrating and refuting the objections and doubts against the breeding of the Negretti sheep. I wish this, because I am fully convinced that the new system will mark out to the production of Merino wool those paths in which it, steadily progressing, may continue to meet the demands of the present time, and not be obliged to avoid the competition from foreign countries. An improvement in the agricultural interests, appropriate breeding and careful keeping of the animals must combine, if the efforts to obtain from the Merino sheep a good cloth-wool in large quantities shall succeed. The material for accomplishing this end—the Negretti sheep—is at the command of foreign countries engaging in the production of Merino wool, as well as at ours, but we need not apprehend that the conditions, *sine qua non*, of a successful breeding of Negrettis just mentioned, will be fulfilled beyond the ocean as soon as animals of this race can be transported to those foreign countries. Further, we need not apprehend that the better quality of our article will not be fully appreciated and command adequate prices on our markets; for whatever improvements, by means of ingenious machines and methods of process, the manufacturer may avail himself, and however far his art in concealing the faults of a defective wool may go, yet he will be compelled there to purchase his supply for manufacturing the finer articles, where the sheep-breeder succeeds most easily in producing a faultless wool. This is an appeasing comfort to the breeders in all these regions of our country where the meat-market is not remunerative, and where there is, as yet, no prospect of making the breeding of sheep more profitable by developing the fattening quality of the flock and by increasing the production of meat. Under these junctures prevailing most extensively in our more northern districts, it is peremptorily demanded of the agriculturist to direct his whole attention to the production of wool, and, by a heavy weight of fleece and a valuable article, to secure such revenues as are not exceeded by those of the breeder who keeps an eye upon the demands of a remunerative meat-market, and endeavors to meet it. The opinion gaining more and more ground, that the greatest riches in wool and the most excellent quality of the Merino wool are not incompatible, but even properties susceptible of combination and the urging necessity of preventing, in this way, a decrease of the profitableness of the Merino breeding, where it is confined principally to the production of wool, must make more and more friends to the breeding of Negrettis. It will give a new and vigorous impulse to the establishment in all those regions which, under the existing agricultural circumstances, cannot do without sheep bearing excellent wool, in a large quantity.

I have endeavored to expose the defects of Escurial breeding; and as I

am conscious of not having colored any picture too vividly, I may expect to receive the approbation of those breeders who have long adhered to the principles of Electoral breeding. This I may hope only of those breeders who in managing their flocks, are governed by considerations of agricultural economy. This is not always the case. Passion may incite a fascinated adorer of the fineness, nobility and elegance of the wool fibre to develop these properties to the highest pitch of perfection possibly attainable, no matter how small the net profits of his establishment may be. He is compensated for this loss by the just pride of furnishing the gladly surprised manufacturer with the most excellent product of which the breeding of the Merino sheep is capable, for manufacturing the costliest textures, and thinks the loss in the revenue to be counterbalanced by the moral satisfaction derived from the consciousness of having contributed to the preservation of the honor of Merino breeding in Germany. Instances of this kind are not very rare, even in our selfish times so much attached to lucre.

If we except this minority of those breeders whose measures are regulated by other motives than agricultural revenues, the expectation seems not to be unfounded, that the principles forming the character of the breeding of Negrettis will be more generally adopted, and that consequently, at no distant day, the Electoral race will be superceded whenever the state of agriculture guarantees that thoroughbred flocks will thrive.

It may appear more doubtful whether the new system will always distinctly discern its object, and pursue in an unbiassed manner the paths marked out for it. If I am not mistaken, the views of a portion of the advocates of the modern race justify the apprehension that onesided efforts which have so seriously injured and brought down the breeding of Electorals, will also in this case arrest favorable results.

No cultivated race in the world is so reliable that the breeder may carelessly glide along with it, like the skipper in a safe canoe on a wide, deep river; we navigate a deceptive channel, and the helm has to be managed with a cautious attention, if we will avoid breakers and keep the craft afloat. We may, therefore, be permitted to describe some of the rapids and breakers in the new channel of Negretti breeding, which might prove dangerous to us. Among these I mention:

1. *Regardless cultivation of the folds.* In the Electoral race the folding of the skin was repudiated, and was only suffered to show a sign of itself on the neck, in order to prevent any deterioration of the quality of wool. Thus, art created the animal shaped like the gazelle, with folded, thin, and closely fitting skin. The tendency of Negretti breeding was different; what the breeding of Electorals had extorted from the plasticity of the

race appeared as a violation of nature and overgrowth in the eyes of the breeders of Negrettis, whose efforts aiming at appropriate forms of body, extension of the wool-field completely covered, and density of the skin, did full justice to the animals full of folds, with which they hoped to attain their ends sooner.

It cannot be denied that the smooth, foldless skin of the Merino sheep seldom furnishes the means for creating the greatest density in the growth of the wool; the efforts to give the flock this property constituting the heavy weight of fleece, of course, favored those animals whose wrinkled skin, densely folded all over the body, distinguished them even as lambs; because experience showed that among them there were found the individuals richest in wool. Here they had to acknowledge that the inferior quality of the fibres upon the folds, in comparison with the wool standing beside it upon the foldless skin, was not gratifying; but if they would not renounce the anticipated profits, they could not be over scrupulous, and had to take the inferior wool from the folds in the bargain. The cautious breeder left the decision to the worth of the wool and to the scales, whether the more wrinkled animal be also the more profitable and practical one, since the fold of the skin was only a means to attain his end, but not the end itself. He observed that the skin richest in folds did not always show the densest growth of wool, but that in this case, by a regardless cultivation of the folds, without restriction or regard to the quantity of wool, an overgrowth may be effected, in which there appears a luxuriance of the skin without fullness of fleece, and the feed is wasted for a useless production—skin and yolk—in abundance. Further, it was observed that if the quality of the wool on the fold of the skin is too much disregarded, the latter at last will be clothed with a hair similar to that of the dog or goat, which will spread over the whole fleece to such an extent as to detract considerably from its value. On the other hand, it has been proved feasible, by cautious and careful breeding, to secure to the large folds around the neck, on the belly, at the root of the tail, and on the leg, if not a finely-curled, yet a mild, soft and undulating, glossy hair, and to the smaller folds of the skin on the other parts of the body, a wool, which as to fineness, character and formation of staple, was apparently inferior to the wool growing by its side only to the third shearing, but after that could hardly be distinguished from the adjoining staples of the smooth skin.

In consideration of such results, of which all prominent Negretti flocks may boast, we must denounce the tendency which we have designated above by the term of *regardless cultivation of folds*, as blamable and injurious to the good cause. According to it the largest number of folds is deemed the highest grade of the originality of the race, and without regard

to the weight of the fleece, the density of the skin, and the nature of the hair upon the skin of the fold, the animal is considered the more valuable the more monstrous it appears in this particular. Therein we cannot see any originality of race, but only an original view and strange taste, which must have a detrimental effect upon the profitableness of breeding.

2. *Regardless efforts to increase the quantity of wool.* The unfavorable results of the efforts to produce the finest wool by the breeding of Electorals, could not fail to astonish the agriculturist calculating more closely now than formerly. A change of views was brought about, and the reaction often caused the breeder to fall from one extreme into the other. The fineness of wool, which in many cases it had cost the efforts of a generation to bring to this state of perfection, was sacrificed with a certain self-complacency; the nobility, the equality, the truthfulness of the wool were hazarded, and surrendered to the blind demands for large quantities of wool. It seemed to be advantageous and timely to break with the things gone by, to forget the established doctrine in regard to the wool fibres and staple, and to make the further process dependent on the principle "that science must go backward."

"*Nunguam retrorsum!*" the greeting with which the advocate of retrogression was received at one of the finest festivals of our days, also ought to be a warning admonition to us in our industrial efforts.

If the opinion were correct, which declares it impossible to combine a heavy weight of fleece with those qualities requisite in an excellent cloth-wool, then this passion for quantity, and nothing but quantity, might pass, but since this combination is feasible, as has been evidently proved by an intelligent breeding of Negrettis, with proper regard to wool, it must be considered a precipitation of things, if we, in adopting the Negretti breed in the place of the Escurial, would not save as many as possible of the superior qualities of the latter race, but throw away the good things with the evil. We must lift up a voice of warning when we hear of the selection of a buck for Escurial flocks "rich in poverty and nobility" made, with remarks like the following: "I do not care for fineness and the like; I need a buck with many folds, which has furnished a heavy weight of fleece." Such purchasers are good customers for a number of Negretti flocks whose proprietors endeavor to furnish the material for this taste, and with the aid of a little *hocus pocus* a nice and profitable business may be done with such men. Such and similar views are not essential to the breeding of Negrettis; and if the former breeder of Escurials, wishing to improve his flock by Negretti blood, will look about, he will find that many stock flocks offer him the opportunity of acquiring animals for breeding,

which will furnish him with the desired quantity of wool, without depriving his flock of its innate superiority of fleece.

Yet I must repeatedly and expressly remark, that in this connection I always presume such agricultural conjunctures as render it not advisable to cultivate the fattening propensity of the Merino sheep and enhance its worth to the butcher, at the expense of the quality of the wool; that I, in a word, hitherto have spoken of sheep kept for producing wool, and of breeding them for that purpose in connection with the production of cloth-wool.

But the thing is otherwise if remunerative meat-prices and a sure sale of fattened animals induce the agriculturist to breed sheep for the sake of their meat. Surely there are junctures in which, even in connection with proportionately satisfactory and encouraging prices of fat sheep, it is not advisable to adopt the English breeds or their crosses with Merinos in the place of the latter race, but in which it appears to be more profitable to keep the Merino sheep, and to develop and cultivate its fattening quality as far as the race admits of it. Then the tendency in breeding becomes another one. The excellency requisite in a *cloth-wool*, to pass for a valuable article and command a high price, is derived from a combination of properties, which have been mentioned so often in this essay that I need not repeat them here. To keep them all combined in the highest possible state of perfection, is a feasible end, even with the addition of quantity. But if another new demand is added, namely, that the animal shall excel by those properties which are requisite in sheep bred for the sake of their meat, without any loss in the quality and quantity of its wool, then the sum of these demands can not be satisfied. If the market demands the production of meat to such an extent as may be practical in the breeding of Merinos, and if the establishment possesses sufficient feeding material to make the operation successful, then the breeder must give up the production of a noble cloth-wool, and engage in the more modest production of card-wool; for the sum of the properties requisite for the latter are more limited, and the demands made by the manufacturer of a good card-wool, is more easily satisfied in connection with an increasing production of meat. Then the production of wool is less troublesome, because the breeder is relieved of the anxious attention he has to pay to the preservation of the large sum of properties requisite in a good cloth-wool, and hence he meets with no serious obstacles in making his animal better qualified for the production of meat. As is the case with the English races, the production of card-wool will occupy the fore-ground, where the Merino race constitutes the material for breeding to further the production of meat. The price of that article of wool, of course, is considerably depressed by the

great consumption at home and from abroad, yet the revenue derived from the sale of wool may still be satisfactory if the flock yields a heavy weight of fleeces. The riches in wool in a flock producing card-wool, which, at the same time, is kept and bred for the production of meat, will be the chief among the properties which should be cultivated. Under these junctures, such stock flocks as are frequently found in France are of incalculable value. The German Merino breeds also present a very desirable material for breeding, for the above-stated purposes, as is shown by several flocks of Mechlenburg, bred with this tendency, and among these that of Boldebuck, above-mentioned. Though the blood of the latter, and kindred stock flocks, is not adapted for improving flocks which are bred for the production of a noble cloth-wool, yet it is desirable and valuable for the production of Merino card-wool, in connection with the production of meat.

ADDRESS OF HON. HENRY S. RANDALL.

Delivered before the Ohio Wool Grower's Association, in Columbus, Jan. 6, 1864.

Mr. President and Gentlemen of the Wool Grower's Association of Ohio:

The present is an extraordinary epoch in the history of the woolen interests of our country. Under the stimulus of the high prices paid for the raw material, production has increased far more rapidly during the last two years than at any preceding period. The United States census returns the number of sheep in the United States, in 1850, as 21,723,220, and in 1860 as 22,163,105,* an increase of but two per cent. in ten years. Of the latter number, there were in the loyal States and Territories, 18,251,328.† In 1862, a much larger proportion than usual, and in 1863, nearly the entire number of breeding sheep in the country, of good age, were saved from the usual diminution caused by slaughtering the fleshy ones; and proportionately few ewe lambs were sold in either year to the butcher. If we assume that the annual increase of our sheep, including breeders and non-breeders, is fifty per cent.; that half of this increase are ewes; and that ten per cent. will cover the number of breeding sheep which are annually drafted from flocks for old age, which die of disease, or are destroyed by casualties, (and especially that worst of all casualties, dogs,) we still have, for the past year, an increase of fifteen per cent. in breeding sheep, leaving wethers out of view.

The gentlemen in the U. S. Department of Agriculture inform me, that from that data collected from the correspondence of that office, they estimate the entire increase of 1863, (including wethers,) at twenty-five per cent., and the entire increase of the last four years at forty per cent., or 7,300,531 sheep, which, added to the previous number, gives an aggregate

* "This differs from the summary in the preliminary report of the census, which contains an error of 1,154,651, in the return from Indiana." I take this statement from the article on the "Condition and Prospect of Sheep Husbandry," in the Report of the Commissioner of Agriculture, 1862, which may be regarded as official, having been prepared by J. R. Dodge, Esq., of the Commissioner's Office. The same article states that "there were returned by the assistant marshals, not included in the regular returns, because not owned by farmers, 1,505,810, making the aggregate 23,668,915."

† Viz: Sheep owned by farmers, 16,263,718; additional not owned by farmers, 1,101,282; in the Territories, 886,328.

of 25,551,859 now in the loyal States, which is 1,882,944 more than the total number in all the States in 1860.

I regard this estimate as rather high. Some of the border loyal States have been ravaged by war, and the probability is that their number of sheep has not much increased since the last U. S. census was taken. I am not disposed to put the entire increase of 1863 at more than twenty per cent.

It certainly has been vastly more rapid than this—unprecedently rapid—in some of the new States and Territories, for a period of several years. I will cite two examples. The St. Paul Press gives the following statistics of wool production in Minnesota:

	No. of sheep.	Am't of wool clipped.
1850	80	500 pounds.
1859	4,000	7,000 "
1860	12,000	19,200 "
1861	25,000	75,000 "
1863	175,000	500,000 "

The people of that State anticipate that when their State Census is taken in 1865, their flocks will have increased to 500,000 sheep, and their wool clip to 2,000,000.

In a paper read before the California State Agricultural Society, by James E. Perkins, Secretary of the California Wool Growers' Association, it is estimated that the following amounts of wool were produced in that State in the years indicated:

1854	175,000 pounds.	1859	2,378,250 pounds.
1855	360,000 "	1860	3,260,000 "
1856	600,000 "	1861	4,600,000 "
1857	1,100,000 "	1862	5,530,000 "
1858	1,428,351 "	1863	6,857,169 "

The highest average quarterly prices paid for wool during the thirty-five years which closed with 1861, were 75c. for fine, 63c. for medium, and 50c. for coarse; and the two first named qualities commanded those prices but through a single quarter—the third one of 1831. During nine other quarters, or two years and three months, fine wools averaged 70c. and medium 60c. per pound. During seven of the same quarters, coarse wool averaged 50c., and during three of them 47c. per pound. Throughout the whole thirty-five years, fine wool averaged 50 8-10ths c., medium 42 8-10ths c., and coarse 35 5-10ths c. per pound. The wools above classed as fine, included Saxon, grade Saxon, and choice lightish fleeced American Merino; the medium included American Merino and grade down to half-blood; the coarse included one-fourth American Merino and below.

The period of thirty-five years above indicated, extends back to the first establishment of our woolen manufactures on any broad and permanent

basis, and represents our woolen interests under every variety of circumstances, and in every phase of prosperity and adversity. Eight different woolen tariffs were in force—some of them, like that of 1828, stimulating production and manufacture into *manias*—and others, like that of 1846, striking down at a blow a great branch of our manufactures, (that of broad cloth,) and actually revolutionizing the sheep husbandry of our country. It was the death-knell of fine-wooled sheep* in North America. Periods of pecuniary inflation and depression succeeded each other like the sunshine and storms of tropical skies. Thus the wool prices above given may be said to display about the degree of strength and persistency possessed by the wool growing interest, in our country, down to the opening of the present civil war.

This picture would not be historically complete without a statement of the prices of wool during the war of 1812, and during the maritime and commercial restrictions which preceded that event, but I have given this elsewhere; and those prices occurred under circumstances so different from those that now prevail, or ever can again prevail in our country, that they furnish no important lesson pertinent to the inquiry which I propose to enter upon.

Fine wool is now about 10 cents, medium about 17 cents, and coarse about 25 cents higher per pound, than they have ever been before since the war of 1812, taking the contemporaneous paper currency as the standard of value.

The rise in the price of wool has naturally been accompanied by a rise in the price of sheep. The average price of the latter, for example, in Ohio, for the ten years ending with 1860, is estimated to have been a few mills less than $1.29 per head. In New England, New York, and some other States, they were somewhat higher; but taking our whole country together, they did not, for the same period, average more than $1.50 or $1.75 per head. To-day, they would probably average double the last named sum. No one ever saw common and grade sheep so high priced before; and pure blood Merinos have reached the "high water marks" of 1809 and 1810, and of the period of the importation of the Saxons, between 1824 and 1828. Frequently in the first, and occasionally in the last of those periods, from $1,000 to $1,500 were paid for a ram, and $1,000 for a ewe. Within the past year I have known $2,500 to be offered and refused for a ram, and $1,000 per head to be offered and refused for ewes, and $20,000 to be offered and refused for fifty ewes. All these were genuine offers. Several rams were sold last Fall from $1,200 to $1,500 a head and quite a number of ewes from $400 to $800 a head. From $100 to

* I mean really fine-wooled sheep, like Saxons, high grade Saxons, &c.

$150 are almost as common prices for good full blood stock ewes in Vermont, as $40 and $50 were five years ago.

In the prices of sheep and wool, we have a sufficient explanation of the enormous increase in their numbers which is now taking place in our country. In a moment of such remarkable apparent prosperity, are not intelligent wool growers called upon, like the mariner who feels the favoring breeze swelling into a gale in his sails, to look warily about for those portents which indicate whether the ship can hold on safely under her present canvass—or whether it is necessary to "furl away" to meet the coming squall?

The important questions which now press themselves on the attention of every considerate flock-master, are: Is this extraordinary advance in the market value of the sheep and wool the result of exceptional and temporary causes, and therefore likely to be of limited continuance, or is it occasioned by circumstances which may be expected to be of permanent duration? If it is to be temporary, how rapidly, and to what extent, will it recede? Or, to generalize these and many similar questions into one, What are the future prospects of wool growing in our country? This is the vital question of the day appertaining to that important industrial interest which this Association has convened to consider, and I may therefore presume, gentlemen, it is the one you would prefer to hear discussed on this occasion.

I. Is the existing advance in the market value of sheep and wool, the result of temporary or permanent causes?

The rebellion of the cotton growing States of the Union, and its resulting effects, have cut off, or vastly diminished our supply and the world's supply of cotton. Wool is required to take its place, and this has produced scarcity and correspondingly high prices in the latter commodity. From 1841 to 1850, inclusive, the cotton crop of the United States averaged 2,173,000 bales per annum, and from 1851 to 1860, inclusive, 3,251,-911 bales per annum. In 1850, the annual manufacture of cotton in the United States, was 487,800 bales, or 195,120,000 pounds. In 1860 it had reached 910,090 bales, or 364,036,000 pounds.* The latter amount cost $55,994,755, which is less than seven cents per pound. In 1863, those best informed on the subject, estimate the consumption at but 4,000 bales per week, or 208,000 bales for the whole year—only about twenty-five per cent. of the former consumption. And this would have been considerably less but for the recent re-opening of the trade with New Orleans.

This enormous diminution of production has fallen heavily on the manufacturer as well as the consumer. Most fortunately, the cotton spinners of

* According to census returns, the whole crop grown in the United States in 1860, was 5,196,944 bales of 400 pounds each.

Massachusetts, alarmed by the prospect of a short crop in 1860–'61, laid in a full year's supply from that crop, and by running on short time in 1861, they continued to operate a portion of their machinery until the latter part of 1862, at a large profit. In November and December, 1862, the scarcity of goods carried the price of cloth to a point which gave a small profit at the ruling prices of cotton, and the same state of things has continued since. Yet in Mr. Bachelder's report to the Boston Board of Trade, on the cotton manufacture of 1861, he estimated the spindles stopped in the last six months of that year at half the whole number.

In Mr. Atkinson's report to the Boston Board of Trade, on the cotton manufacture of 1862, from which I have derived most of the foregoing facts, it is stated that on June 1st of that year, of the 4,745,750 spindles north of the Potomac, 3,252,000, or sixty-eight and a half per cent. of the whole number, were stopped; and that in the succeeding July, more than seventy-five per cent. of them were stopped.

I learn from the same authority that the expenses and interest on unused mills of the value of $600,000, kept in good repair, exceeds eight per cent., without including the depreciation of idle machinery.

But between these clouds there falls, thank God, a beam of the brightest sunshine. It appears that the operatives have not suffered. Enlistments in the army and the demand for mechanics in the government workshops, have, says Mr. Atkinson, given employment to the men, while the woolen mills, more active than ever before, and the manufacture of shoes, clothing, etc., have absorbed the labor of female operatives, so that at Lowell, where the stoppage of cotton spindles has been largest, deposits in the savings banks actually and largely increased in 1862.

Let us take a brief glance at the falling off of our exports of cotton. The following statements are derived from official returns to the Treasury:

	1860.	1861.	1862.
Value of cotton exported	$191,806,555	$34,051,483	$1,180,113
Value of cotton manuf'd and exported	$10,934,796	$16,957,038	$2,937,464

But custom-house returns do not disclose the real facts, so far as exports are concerned. The officers of our treasury have ascertained from foreign official exhibits that there were irregularly and surreptitiously exported, during the year ending June 30, 1861, the following amounts of cotton, not of course included in our custom-house records:

To England	750,663,546 lbs
To the Continent	133,000,000

With the irregular and surreptitious exports of 1862, the total is swelled to the following figures:

	1861.	1862.
Cotton, pounds	1,221,179,642	192,195,930
" value	$150,331,108	$38,606,206

The greater efficiency of the blockade in 1863, diminished the amount of cotton escaping from the southern States by sea, but enough was hauled from Texas to Metamoras, in the Mexican territory, and shipped from thence direct, or through the West Indies, to England, to give the latter a better supply of American cotton that year than she received in 1862.

In Mr. Ure's recent work on Cotton Manufacture, it is estimated that the number of cotton spindles in Great Britain, in December, 1860, was 38,099,056; that the number of pounds of cotton consumed that year was 1,050,895,000, and that the total value of the product was $441,664,718. It gives some idea of the rapid extension of the manufacture, when I state, on the authority of a parliamentary return, that during the ten years preceding the close of 1860, cotton spindles increased in Great Britain at the average rate of 20,718 spindles per week. In 1861, England consumed 43,350 bales of cotton per week; in 1862, 20,790 bales per week: in 1863, 25,750 bales per week.*

It appears to be imagined by some persons that cotton, or at least that American cotton, as a staple of industry, has had its day,—that it will never again be extensively cultivated in our country,—that wool, flax, hemp, jute, and other textiles yet to be discovered, or made available, will become substitutes for it. There is not a shadow of foundation for such an opinion. Cotton is one of the greatest physical blessings which God has vouchsafed to man, and as a textile is only second to wool both in value and necessity. If it could be supplanted by any substitutes, those substitutes would, to the same extent, supplant wool—but, in reality, you might as well talk of supplanting beef, pork or corn! Like each of the three great articles of sustentation just named, it is not, of itself, indispensable to the support of human life—but perhaps the loss of neither of them, taking the whole world together, would produce so irreparable a chasm in the comforts and solid utilities of life.

All the attempted substitutes for cotton have proved failures for general purposes, and in the comparative cost of production. Nor can wool be considered an exception, when it and cotton now command about the same prices, and when it costs about four or five times as much to grow a pound of wool as a pound of cotton.

---

* The bales of 1862 and 1863, are as five bales in weight in 1860 and 1861, being Surats, &c.

But, say some, the discontinuance of the cotton supply from the United States will force its production on other countries, and before civil war closes production will become so firmly established in them that it can not subsequently be supplanted; but, on the contrary, aided by cheaper labor and soils, it will drive the American article even from our own markets. Such a result would not benefit the wool grower, for it would cheapen a competing staple. And, let me remark, it would dry up one of the most prolific fountains of our national wealth, independence and prosperity.

But, in truth, there is no danger whatever of such a misfortune. Under the spur of the present demand, cotton exports are constantly increasing from India, Turkey, Siam, China, Japan, some of the West India Islands, Brazil, Peru and Honduras. But in the first place, not one of those countries can produce an article comparable with the American in value. Their cottons are all too long stapled, too coarse, or are defective in other essential qualities. In British India, the hardest struggle has been made to rival and supplant American production. But Surats, as India cotton is denominated in commerce, can not, on any present machinery, be profitably spun into yarn above No. 35. On January 30th, 1862, the price of middling to fair Surats in the Liverpool market, was from 14¼ to 18 pence,* while that of a corresponding grade of American cotton was 22 to 26 pence per pound. The shipment of the former from India to Liverpool was smaller in 1862 than in 1861. In 1860, when these same competing cottons were in the market, and when Great Britain manufactured 20,196,420 pounds of cotton per week, 87½ per cent. of it was American. In the report of Mr. Cassels, on Cotton in the Bombay Presidency, published in England in 1862, it is distinctly admitted that the staple of the India cotton can not be materially improved; that it must continue to hold a subordinate place in the European markets, and that the American variety can not be successfully grown there.

II. In none of the countries named can cotton production be rendered as profitable as in the United States, because none of them are so well adapted, by their natural conditions, to its culture. In India, for example, the average product is less than 70 pounds per acre; the number of acres per hand but two or three; and it is cultivated only as a rotation crop once in three or four years—while a fair yield in Texas is 500 pounds, and an average yield 400 pounds to the acre, and one hand tills ten acres, with five acres of corn. The average yield of all the cotton lands of the United States does not probably fall short of 350 pounds to the acre. The natural advantages of the United States are also regarded as decidedly

* English pence, it will be born in mind, are nearly twice the value of United States cents.

superior to those of all other countries into which cotton culture has been introduced, excepting Queensland; and concerning this, Mr. Atkinson very properly observes that "the distance from market, the scarcity and high price of labor, and the neighborhood of gold fields, must prevent any very rapid development in the cultivation." It is well to remember, in this connexion, that not a thousandth part of the cotton lands of the Southern States have yet been devoted to that staple. As with our coal fields, a supply has obviously been prepared for the future use of the world through the coming ages.

There is one more very important question connected with this subject. Many persons are impressed with the idea that the healthy and profitable cultivation of cotton requires a particular kind of labor. But why should it? Cotton is mainly tilled on uplands, which are as healthy as Southern Ohio or Illinois. I have investigated the subject of profit carefully, and though I have not time now to give the facts and figures, I declare to you that it is as demonstrable as the simplest problem in arithmetic, that the cultivation of cotton is highly profitable, and that for some years to come it will be pre-eminently profitable—as profitable in proportion to capital invested as wool growing—to men of every color and social condition. Such being the facts, can there be any doubt that at the close of the rebellion, the cotton crop will be, as speedily as practicable, restored to its former magnitude?

I have dwelt on this topic at great length for the purpose of exhibiting an outline of those facts which demonstrate the fallacy of the idea expressed in the popular phrase, "King Cotton is dead," an idea which appears to have become widely and deeply imbedded in the public mind, and which, if adopted by wool growers, will establish a false basis of action, and lead to eventual disappointment and loss. I speak of cotton only as a material object of production and consumption. In any other connexion, a discussion of its prospects would be out of place on this occasion.

If, then, cotton is to be fully restored to its former place, driving back wool consumption to its natural and economical boundaries, and thus producing a subsidence in the prices of the latter staple, how rapidly and to what extent may that subsidence be expected to take place?

The prices of wool will probably not fall, unless at momentary intervals in transient fluctuations of the gold market during the civil war, because the main and essential circumstances which produced the rise in price must continue as long as the war continues. There is, indeed, a much stronger probability that the price will advance rather than recede. The great wonder is, that with the ruling prices of gold, exchange and cotton, it has

remained so low. I learn from Messrs. Euston & Company, of New York, that middling cotton has borne the following prices* for the last three years:

Year.	Lowest Price.	Highest Price.	Average Price.
1861..............	11¼ cts.	38 cts.	17½ cts.
1862..............	20 "	69 "	43 "
1863..............	51 "	92 "	72½ "

Thus, American cotton, in 1863, rose more than 800 per cent., and averaged more than 600 per cent. above its average price, even in Liverpool, from 1846 to 1860—which was a fraction over eleven cents a pound.

The following table of wool prices, which I have received from Mr. George Livermore, of Boston, brings the quarterly averages from October, 1861, (the point where they were left in the table for the thirty seven preceding years, published in the *Practical Shepherd*,) down to the present day:

Year.	Quarter Ending.	Fine.	Medium.	Coarse.
1862...........	January..............	48 cts.	45 cts.	42 cts.
"	...........April..............	50 "	56 "	56 "
"	...........July..............	47 "	47 "	47 "
"	...........October..............	56 "	58 "	60 "
1863...........	January..............	60 "	62 "	64 "
"	...........April..............	76 "	76 "	76 "
"	...........July..............	74 "	74 "	72 "
"	...........October..............	70 "	70 "	70 "
1864...........	January..............	82 "	74 "	68 "

It appears from this that the average price of fine and medium wools have not, during any quarter since the opening of the civil war, advanced 100 per cent. above the average prices of the thirty-five preceding years; and that the prices of coarse wool advanced a little over 100 per cent. above such average during two quarters. During that thirty-five years, both of the above two first named classes of wool have been repeatedly worth more in gold than they now are.

The small advance in the price of wool in our country, compared with that of cotton, is attributable to several causes. It is not so scarce as cotton, taking the world together. The American wool grower comes into competition, in our markets, with the larger capital, or the semi-civilized labor, or the cheaper lands, or the winterless climates of other countries—or with more or less of these circumstances combined—without adequate governmental protection; without that proportionable degree of it which

* These correspond with the New York Prices Current and Shipping List.

is extended to various other branches of industry which require protection. And incidental causes, heareafter to be named, operated against our wool growers in 1863, which cannot be expected frequently to occur.

I have not time here to compare our existing woolen tariff with the preceding one. On manufactured wool, the value of which, at the last port of export, is 18c. per pound, or less, it imposes a duty of five per cent. (ad valorem;) on the same, the value of which, at the last port of export, is more than 18c. and not more than 24c. per pound, a (specific) duty of 3c. per pound; on the same, the value of which, at the last port of export, is over 24c. per pound, a (specific) duty of 9c. per pound; on the same, imported in such a state by mixture of dirt, etc., as to reduce it to 18c. per pound, or less, a duty of 9c. per pound. On woolen cloths, cassimeres, shawls and all manufactures of which wool is a component material, if valued over one dollar per square yard, or weight under 12oz. per sq. yd., it imposes a duty of 18 cents per pound, and 35 per cent. (ad valorem). On the same articles, if not otherwise provided for, it imposes a duty of 18c. per pound, and 30 per cent. (ad valorem). On nine leading kinds of carpeting, value $1.25 per sq. yd., or under, it imposes a duty of 45c. per sq. yd.; on the same value, over $1.25 per sq. yd., a duty of 55c. per sq. yd., "provided that none of the above carpeting pay a less duty than 24 per cent." (ad valorem). On certain other kinds of woolen carpeting, it respectively imposes duties of 38c. and 28c. per sq. yd.

The annual average of prices of imported wool, as obtained by official data, from 1840 to 1857, ranged from six to thirteen cents, gradually increasing with occasional fluctuations. It is estimated for 1860 at fourteen cents; for 1861 at fifteen cents, and thence the record in pounds is kept officially as before, averaging a little over sixteen cents per pound in 1862, and about the same in 1863.

The amount of protection to the manufacturer of woolens, as compared to the protection given to the producer of wool, will be shown by taking the case of a yard of cloth that weighs 12oz., made of wool, imported at the valuation of 16c. per pound at the port of shipment. Two pounds of such wool should be abundantly sufficient to produce 12oz. of cloth. These two pounds of wool will cost thirty-two cents, and must pay a duty of five per cent. on that valuation, which will be one cent and six mills. Thus the manufacturer can purchase and pay the duty on the material for a yard of cloth that will weigh 12oz., for thirty-three cents and six mills. To this must be added the cost of transportation. If the same wool is manufactured before it comes to this country and is imported in cloth, it must pay in duties, first, eighteen cents per pound on its weight, which, for the twelve ounces that the cloth weighs, is thirteen cents and five mills;

second, thirty per cent. ad valorem, and if we assume that the yard is worth one dollar, this will be worth thirty cents, which gives an aggregate of forty-three cents and five mills in duties on a yard of such cloth. It, then, results in this: That the duties on a yard of this cheap cloth are nine cents and nine mills more than the cost of the raw material from which it is manufactured! The case of cloths worth more than one dollar a yard is still stronger against the wool grower and in favor of the manufacturer, provided they can be made of materials not exceeding the average cost of imported wool. In the case of dearer cloths, made of finer and costlier foreign wools, the increase of the protective ad valorem duty more than compensates for the increased duty on the wool. In every aspect and point of view, then, the present tariff is a "manufacturer's tariff."

Gentlemen, have any of you obtained the impression that these foreign wools, imported at so low an average price, are all of a coarse quality—fit only for carpets and the lowest priced cloths? On this subject, I will quote the authority of Mr. George William Bond, the well known wool broker of Boston, who is annually associated with Mr. Livermore in drawing up the report on wool to the Boston Board of Trade. I received from him, under date of December 28th, 1868, the following estimate of imports of wool into the United States in that year, based upon custom house returns to a recent date, from New York and Boston, and estimates for other ports and for the remainder of the year:

From whence Exported.	Total.	Pounds Fine.	Pounds Coarse
Europe	21,000,000	11,000,000	10,000,000
Cape of Good Hope	11,000,000	11,000,000	.. ..
Buenos Ayres, &c	21,000,000	15,000,000	6,000,000
Russia	2,000,000	.. ..	2,000,000
East India and China	750,000	.. ..	750,000
Spain and Portugal	750,000	.. ..	750,000
Turkey	3,500,000	500,000	3,000,000
Mexico	1,500,000	.. ..	1,500,000
Chili	2,500,000	.. ..	2,500,000
Various places in small parcels	1,000,000	.. ..	1,000,000
	65,000,000 lbs.	37,500,000	27,500,000

These fine wools are considered as good as our own full-blood Merino wools, and some of them superior. On this subject, Mr. Bond wrote to me December 10th.

"There are many styles of goods for which we must have these [foreign wool] as with the exception of a small district in Virginia, there is no place in this country that has ever raised wools with the felting and finishing properties required for their manufacture; and the qualities of these

classes of goods must increase rapidly under our present protective system."

The value of wool imports into the United States for the last four fiscal years, have been as follows:

Years ending	Value.
June 30, 1860	$4,842,152
" 1861	4,717,350
" 1862	7,370,667
" 1863	11,060,062

The last two years, let me remark in passing, exhibit the briskness of the shoddy trade. The import of this, in 1862, was 6,291,077 pounds, valued at $422,374; in 1863, 8,710,699 pounds, valued at $645,370.

The free wool from Canada, in 1862, was 1,918,763 pounds, valued at $569,839. In the first half of 1863, it was 1,094,331 pounds, valued at $627,783, which, added to the wool on pelts from the same country, makes a total of $735,027, for six months—an increase, if continued at the same rate through the year, of 150 per cent.

The above returns are from the books of the Treasury, excepting the third and fourth quarters of 1863, which are from the wool circular of Pettibone & Wallace. These are slightly in excess of Treasury returns, so far as they were posted up when inquiries were made for me at that department:

Let us now turn to the imports of manufactured wool in the same four years:

Years ending	Value.
June 30, 1860	$37,937,190
" 1861	28,487,166
" 1862	15,044,065
Six months ending	
Dec. 30, 1862	12,218,697

If the imports of the remaining half of the fiscal year 1863 equal those of the first half, the imports of that year will still fall more that $4,000,000 short of the imports of 1861, and nearly thirteen and a half millions below the imports of 1860. When we compare this with the fact that during the same period our wool imports have advanced towards 150 per cent., we learn, in another way, or by a different mode of proof, whether it is the American producer or manufacturer of wool who has received the principal accession to his business, and consequently we may presume to his profits, since the passage of the present tariff.

Information of the actual amount of our woolen manufactures not being accessible, I have attempted, without success, to obtain definite statistics of the increase in the sets of our woolen machinery, of their increase of

capacity, and of their running hours, since 1859, when a full enumeration of them was furnished by Mr. Bond to the Boston Board of Trade, and published in the wool report of that year. There was then, in New York and New England, 2,542 sets distributed in 655 establishments. Mr. Bond writes me that he believes the number of new sets put into operation since that period, exceed 1,000; that they are all of the most effective character, and that all woolen machinery has been run extra hours. Owing to the last named circumstances, the mere numerical increase of sets, though it reaches 40 per cent. in four years, gives no idea of the actual increase in manufacturing.

I have mentioned that incidental and unusual circumstances operated against the wool grower in 1863. They are thus explained in a letter to me from Mr. Bond. He says:

"Coincident with our own increased demand for fine wools, those grown in the Southern Hemisphere have been unusually good this year, especially those grown in Buenos Ayres and Southern Africa, whence we draw largely our supplies. The season in both these countries was very favorable, rendering the staple of the wool very long and healthful, so that it has been available for many purposes for which it has not before been used. I think I can safely say that the clip of the autumn of 1862, at the Cape of Good Hope, has proved itself fitted for the wants of four manufacturers, where that of the previous year would have suited one. The same is true of the clip of Buenos Ayres, but not to the same extent. The clip of 1861 was very burry and weak, and much of it now remains unmanufactured, while that of 1862 sold readily. Accounts from there do not indicate so good a clip for 1863, and we cannot expect such another from the Cape. That of 1861 has never, as a whole, been equalled since the wool has been known here."

Are we told that the enormous increase of wool imports is necessarily occasioned by the present inability of American producers to meet the demand? This is true. But if foreign wools do not compete directly and injuriously with the *prices* of our own, how does it happen, in a period demanding such vast importations—a period of such scarcity—that American wools have sold so much more tardily during the past season than usual, and that they only reached their present prices—moderate ones, compared with the prices of other products—when the doubly effective, night-and-day running, all-devouring machinery of the Eastern States, could not find enough cheaper suitable foreign wool to devour, and was actually compelled to use American wool to run full time? Does any one imagine that American wool would have reached its present prices if cheaper foreign wool of equal quality had continued to flow in abundantly? But

the decreasing supply, the enormous rates of exchange and the duties, have forced up the prices of these so that American wool can compete with them in our markets at the present prices.

The prices current of the principal foreign fine wools in New York, are thus given on the 6th day of December, 1863, and on the 6th day of January, 1864, in Walter Brown's Wool Circular:

Australian Fine....................................	Unwashed,	43 cts. to 50 cts.
Cape of Good Hope, Fine...........................	do	42 " " 48 "
Buenos Ayres, Saxony..............................	do	40 " " 42 "
Buenos Ayres, Merino..............................	do	38 " " 40 "

By the rule of shrinkage usually adopted in reference to American unwashed wools—i. e., one-third the gross weight—50 per cent. would have to be added to the above prices to make them correspond with the prices of our brook-washed wools. But the foreign unwashed wools are not only far dirtier than our own, but oftentimes burry, so that generally a shrinkage of one-half on their gross weight would not go so far to bring them to a state of purity as would a shrinkage of one-third on our own wools. Indeed, I think the difference is often much greater, but I choose to speak within bounds. To bring the above prices of foreign wools to the scale of the prices of brook-washed wools, allowing a shrinkage of one-half, 100 per cent. must be added to them, and they will then stand thus:

Australian, Fine....................................	Washed,	86 cts. to 100 cts.
Cape of Good Hope, Fine...........................	do	84 " " 96 "
Buenos Ayres, Saxony..............................	do	80 " " 84 "
Buenos Ayres, Merino..............................	do	76 " " 80 "

If wools, fully equal in quality with our own, and some of them claimed by leading wool merchants to be superior to prime American Merino wools, can compete with our own at present prices, when it takes at least $1.60 of our currency to buy a gold dollar's worth of foreign wool, what expectation can we possibly entertain that our wools can maintain any thing like their present prices, or good prices, when these same foreign wools compete with them, and when ours are no longer protected by the present enormous rates of exchange?

To these rates of exchange exclusively, do we owe the present prices of our wool—called high prices, but actually moderate ones when compared with those of other commodities. The tariff duties would not be a drop in the bucket in producing such results.

Am I met by the inquiry, Why, then, under the present amount of protection, is there such an extraordinary effort being made to increase sheep and wool production? The question is already answered. It is because

the present price of gold and exchange protects our wool growers. We owe nothing, or next to nothing, to the tariff. And even the price of gold would not allow us to preserve present wool prices but for the actual scarcity of the commodity, and for the resolution of American growers to realize an advanced price on their staple bearing some proportion to that on woolens, and to other raw and manufactured staples. But we had to fight hard to obtain that advance, and we should not have succeeded, at least in 1863, but for the growers of Ohio. Ohio, the great wool growing State of the Union, led the van. Her wool growers undauntedly said to the manufacturers: "Pay us for our wools a price which is reasonable, according to the state of the markets and the currency—let us have some share of the profits made on our own staple—the day has gone by when we can be starved to sell against our wishes." That was what Ohio said, by her action, and the result of it was—not victory over another interest—but a better attainment of the just and equal rights of the wool growers. Anterior to that rise in prices, we were actually selling our fine and medium wools for a less gold value than they had averaged for the thirty-five years preceding the war!

But I had forgotten the brilliant theory broached in some quarters, when the present tariff was under discussion in Congress, that the American wool grower needs no *protection*—that it is contrary to the sound principles of political economy to extend that protection to him! For my part, gentlemen, I know of but one theory on which protection by discriminating duties on imports, can be justly given to any description of industry whatever—for in its first and direct effect, it is but taxing the whole for the benefit of a part. That theory is, that protection fosters and establishes branches of industry necessary to the interests of a nation, which, if unprotected, could not become so established; and the whole get back their money by the eventual cheapening of the protected article, or they get back its equivalent by the promotion of the public safety and utility.

Now, will any one be guilty of the self-evident absurdity of declaring that the production of a great necessary of life, like wool, is of less importance to the interests of an agricultural people, like ourselves, than its manufacture? Does the latter branch of industry give employment and support to more American citizens? Do its profits contribute more to build school houses and churches? Has it sent more representatives into the useful public institutions of our country? Have more of its representatives left their bones at Antietam, Gettysburg and Chattanooga? There is a place, gentlemen, where I shall not deny it has the most representatives, viz: in the lobby of Congress!

Am I asked if I have not repeatedly said, in publications, that in our

country more territory is adapted to the cheap production of wool than in any other country on the globe? I have said so, and I say so still. The mere physical conditions necessary for that production, abound here to a limitless extent. None of the wool growing countries in South America, Afriac and Australia, have any advantages over our western States, except in a climate which does away with the necessity of feeding artificial food in winter, and they have no advantage over Texas, even in that particular. But the labor of free Americans must be better paid for than the labor employed in those countries. In South America, the proprietors of the great wool growing establishments own leagues instead of acres of land the shepherds are half-civilized men, whose compensation is but little beyond their cheap subsistence. How far native labor is employed at the Cape of Good Hope, or convict labor in Australia, I am not able to say; but this much is certain, that it is in both countries of a very different quality from American labor, and in both countries we are called to compete with British capital—capital so large and so solicitous for investment that it is contented with a per centage of profits on which American farmers would starve. The American wool growers in the older Eastern and Middle States, do not average 150 acres of land and 150 sheep each. I have not had time to make an arithmetical computation, but judging from a cursory inspection of the data furnished in the recent report of Mr. Klippart, Corresponding Secretary of the Ohio State Board of Agriculture—advanced sheets of which that gentleman kindly sent to me—your own Ohio flocks do not average much, if any, over the same number.

The American wool grower's capital, at starting, is, in a majority of instances, little beyond his own broad shoulders and the ever-busy hands of his faithful wife. All the property he can hope to possess is to be wrought by the sweat of his brow from the bosom of the earth. Yet the axe has not ceased to ring in the clearing, or the native sod of the broad prairie is scarcely broken, before the school house is built at the cross-roads, and before the church spire is seen pointing to heaven. He and his wife and his children eat of the fat of the land. They are as comfortably clad as princes—they as much scorn the squalor and rags which are the badges of voluntary social serfdom. He taketh his seat among the elders of the land. He is the officer of his church, of his school district, of his town, of his county—perhaps of his State. His sons and daughters are well educated. They fill the places of their parents, or still higher ones. A great majority of our men of genius, our generals, our statesmen and their wives, have such a parentage. Yet when the rural patriarchs I have described go down to the grave, but a small portion of them leave estates worth $10,000. But while they lived they were men—aye, thank God, *men*. It costs

something to perform the duties and live with dignity the life of an American freeman? Such labor can not compete with pauper labor, or semi-civilized labor, or labor which has no such responsibilities, and which supports no such social system. Such capital can not maintain itself in a struggle with hereditary or other amassed capital, which only asks three, or four, or five per cent. profits. Hence, with equal or superior natural facilities for production, the American wool grower must receive protection, or be driven out of the markets of his own country by foreign competition. And for precisely the same reasons, and for no other or better ones, the woolen manufacturer must receive, and he does receive, governmental protection. In his business as much as in the producer's, the natural facilities found in the United States are equal or superior; but the labor and capital employed can not compete with the labor and capital of other lands. The same is true of nearly every branch of protected industry.

I have never been friendly to the enactment of *high* tariffs *for the purpose* of protecting industry. But the exigencies of our government will, in future, demand a high tariff for revenue purposes only; and in adjusting the degree of incidental protection which it must necessarily afford to American industry, we have a right to demand—1st, That the woolen interest shall be protected equally with other interests of no greater importance; and, 2d, That the producer of wool shall be protected equally with the manufacturer of wool. Ohio is the proper State to inaugurate the effort necessary to bring about this change in our tariff laws, and the change will probably be needed by the time it can be brought about.

Let no man misunderstand, or pretend to misunderstand, the animus of my remarks in respect to woolen manufacturers, I preach no crusade against them. It would be suicidal in the producer wantonly to abate their prosperity or check the rapid growth of their business. They furnish him with his only available market. His interests therefore are inseparably connected with their interests. I think it decidedly his policy to cultivate friendly relations with them. The great body of our manufacturers are honorable business men. They have looked out no better for their interests than others would do with the same opportunities. They go into the market only as all other men do, to buy on the best terms. They make fair contracts, and perform them punctually. They make goods creditable to themselves and to the country, shoddy to the contrary notwithstanding. To sum up the whole account between them and the producer in one word, I think they have been as much "sinned against as sinning." But if I go to bed with the most praiseworthy gentleman living, and waking up in the night find him occupying three-quarters of the bed, and that I am in danger of falling out, have I not a right to request him civilly to "lie along?"

Let us now turn our attention to another very important consideration. Is it profitable that the present rapid increase of wool production in the United States will cause the supply to exceed the demand?

I have already stated the value of the wool imports from 1860 to 1863, inclusive. I will now give the amount in weight of the imports, and of the home product, for the same and some preceding years:

Year.	Home product.		Imports.		Total.	
1840	35,802,114	pounds.	1[illegible],006,410	pounds.	50,808,524	pounds.
1850	52,516,969	"	18,669,794	"	71,186,763	"
1860	60,511,343	"	34,566,657	"	95,078,000	"
1861	55,295,050	"	31,338,486	"	86,633,536	"
1862	64,589,307	"	42,713,879	"	107,303,186	"
1863	77,413,070	"	64,433,760	"	141,847,530	"

The home product, to 1860, is for the whole country, compiled from census returns; the imports are from Treasury reports. Since 1860, the imports are mainly official, and the home product is estimated for the loyal States alone, from data obtained in the Department of Agriculture.

To the officers of that Department, and especially to Mr. Dodge, I am also indebted for the following estimates:—The total supply of wool for manufacture for the year ending June 30th, 1863, is set down at 141,847,530 lbs. If to this is added the imported shoddy and "flocks," nearly ten millions more, and the increased product of shoddy from American rags, the total supply of material for the manufacture of the fiscal year 1863, has not fallen below 155,000,000 pounds. This—leaving out of view the imported woolens, which amounted to $12,218,697, in the first half of that year—is more than six pounds of wool to each inhabitant of the loyal States. The dearth of cotton, the extra use and waste produced by war, and the fact that the consumption was chiefly in the Northern and therefore colder States, carried the average per capita consumption considerably above that of our whole country prior to the breaking out of the rebellion, notwithstanding that disposition to retrench personal expenses which was so manifest among our people during the panic and commercial paralysis which attended the early stages of the war. The average per capita consumption in the United States prior to the war, is usually estimated at four and a half pounds.

If upon the return of peace there are thirty-two millions of people to provide woolens for, they will require one hundred and forty-four millions of pounds of wool per annum, with the full former supply of cotton, The restoration of a full supply of cotton, whether the basis of the labor which produces it is reorganized or not—and especially if it is reorganized—must be an affair of some time. There is every reason to suppose that

the increase of population will be as rapid after the war as before; and that emigration will be unusually active.

Let us assume that the war will close by the end of 1864. If we then have 32,000,000 of people, and they again commence increasing in the usual compound ratio of three per cent. per annum, we shall have, at the close of 1874—ten years from the close of the current one—a population of 43,005,321, requiring 194,513,944 pounds of wool. If the 25,000,000 sheep, now in the loyal States, should continue to increase through the same ten years as rapidly as they have done for the last four years, viz: at the rate of 10 per cent. per annum, they will be just doubled in 1874; and the 50,000,000 of them then in the United States will have to yield nearly four pounds of wool per head to meet the requirements of that year —supposing the supply to be drawn wholly from domestic sources.

It appears by the census returns that in 1840 the fleeces of the United States averaged 1.84 lbs.; in 1850, 2.42 lbs.; in 1860, 2.73 lbs.; or a per centage of 46 for the increase of 1850, and 15.2 for 1860. But as the returns were more incomplete in 1840 than in 1850, the former increase is somewhat too large, while the actual average, even in 1860, was perhaps a little larger than the figures given.

In the seceded States, the average, in 1860, was only 1.94 lbs. per fleece. In the loyal States, it was 3.08 lbs. In Ohio, the average was increased from 1850 to 1860, from 2.58 to 3.47 lbs., a gain of 34 per cent. in ten years. In Vermont, the average was increased, during the same ten years, from 3.31 lbs. to 4.12 lbs., a gain of but 24 per cent. Taking a fraction over the Ohio average weight of fleece in 1860—viz: 3½ lbs.—as the average of all the States in 1874, there would then be, with the estimated population and number of sheep above given, an annual deficit of more than eighteen and a half millions pounds of wool.

A margin must be left in the preceding estimate, in favor of a more rapid supply of wool, for the number of sheep which will be found in the seceded States on the return of peace. I have no data whatever from which I can form even a conjecture on that subject. In the eleven seceded States, there were, in 1860, in round numbers, 5,000,000 sheep. In all of them, there has been a great scarcity of labor and of army subsistence. Several of those which had most sheep have been the direct theatres of the marches and struggles of the contending armies, and they have been constantly swept over by bands of guerillas. Sheep, from their comparative incapacity to endure hardships and starvation, are not as well adapted as cattle to follow the march of armies to furnish supplies of animal food; but they are the most convenient resort possible for the predatory guerilla, who subsists on the country through which he passes, and spares neither

friend nor foe. I cannot doubt that especial pains have been taken by the Southern people to preserve their sheep for the purpose of obtaining necessary supplies of winter clothing; but I shall be surprised if, at the close of the war, they have much over the 5,000,000 sheep with which they entered it. These, as already stated, are very inferior to Northern sheep in point of production.

We must also take into account the fact that foreign growers and manufacturers will doubtless continue to meet a part of our demand. But if the amount of duties on foreign commodities necessary for revenue purposes, is wisely distributed among the objects of protection, we shall have very little competition in our wool and woolen markets ten years hence.

In reality, a much greater counter-margin must be left in the estimate under consideration, for its over-statement of the prospective increase of our sheep. I assumed the increase to be 100 per cent. in ten years, merely hypothetically—to meet the views of sanguine calculators—and to show that on the basis of the most sanguine estimate of future production, there is no danger of over-production, if our manufactures continue to flourish and to keep pace with the supply of the raw material. It is not within the bounds of probability, and scarcely of possibility, that the number of American sheep will increase as rapidly during the next ten years as it has within the last four years. Many things will tend to prevent it. In the first place, there is nothing in the present prices or other circumstances of wool which gives its production a sufficient advantage over the production of various other staples, to cause it to draw away from them the labor and capital of the country, in the present proportion, for ten years to come. Other important staples must receive their due share of attention; or, if neglected, their rise in price will speedily draw back labor to them and restore the equilibrium of production.

In the second place, various incidental causes will interfere with so rapid and continuous an expansion of wool production. In the older States, where farm boundaries, systems and fixtures, are more permanent than in the new, the necessary arrangements for it cannot economically be made so rapidly and on such a scale. Disease will occasionally come to injure and discourage inexperienced flock-masters. And, in my opinion, we are to have a year of low prices and panic among wool growers when peace is restored, and when it throws the cotton, which will then be in the Southern States, in a body into the market. There has been much more smoke raised over, than actual fire employed in, its conflagration. The amount remaining in the South is estimated by those most conversant with the subject, at three millions and a half of bales. This temporary supply will be mistaken for a permanent one; and while it is glutting the market, and

while, perhaps, all commodities are subsiding to the gold standard of price, we shall hear as many of those superficial observers, who always judge the future by the present, croaking over an imaginary permanent downfall of wool production, as now see in it the best, if not the only, highroad to El Dorado. Then the inexperienced men, the speculators, and those "rolling stones" who continually roll from one pursuit to another, according to the fashion or "fever" of the day, will betake themselves elsewhere. They came "as fleet as forest deer"—they will be "driven back as tame."

Gentlemen, I have lived through quite a number of these ups and downs, and I have learned to take them with great composure. If I had described only the former, and predicted only the former for the future, it is possible that I should have pleased some of my hearers better. But I could only do so by sacrificing or suppressing what I believe to be the truth.

If I have succeeded in destroying or weakening any exaggerated expectations, I confess I rejoice in it—for they lead only to individual disappointment and loss, and to ultimate reaction against the wool growing interest. But I have uttered nothing which will even tend to discourage the sensible producer, who does not mistake illusions for realities—who is not intoxicated enough by the haschish of a prevailing excitement to fancy every sheep-pasture Sinbad's valley of diamonds.

To the true wool grower, the future is full of rational hope. Everything goes to show that his industry will be better rewarded in the future than it has been in the past. The general tariff policy of our country is better settled. That long struggle is over between the extreme protectionists and non-protectionists, which kept up agitation and uncertainty, and led to those sudden vascillations in legislation which are so fatal to protected industry. The extreme protectionists have learned that the consumers —in other words, the body of the people—will not long endure their policy. The non-protectionists dare not urge a policy below the standard of revenue, or one without discriminations; and henceforth the revenue standard will admit of all necessary protection.

Another highly auspicious circumstance for the future of the American wool grower, is, the solidity and success attained by the wool manufacturing interest. There has been a former class of manufacturers—hybrids between speculators and politicians and stock-jobbers in legislation—to whom we owe little. Their manœvres kept the market unstable and feverish. They overacted and fell. Their successors are generally practical, straightforward men, who seek their gains in the legitimate channels of business. Their prosperity is, therefore, certain, and the steady expansion of their business is equally certain, opening still wider markets for

our wool. Let the latter fact not be forgotten when we ask changes in the woolen tariff. If in those changes we could obtain a particle of undue advantage over the manufacturer—if, to recur to my former simile, we do not leave him full half the bed—it is worse than a barren victory, for we injure both him and ourselves. His decay is our decay. His death is our death.

I will name one more decided advantage which the future possesses over the past. It is in the great and manifest improvement of our wool-producing breed of sheep. The prime American Merino of to-day yields 100 per cent. more wool than the Spanish sheep introduced into the United States by Livingston, Humphreys, and the other original importers. There is no proportionable difference in the size and consumption of the animals; and from all the specimens I have seen, and all the facts I can collect, I judge the American wool to be fully equal to the early Spanish wool in quality. In our prime flocks, it certainly exceeds the present Spanish wool. I have not time to pursue this theme here, but I assert without fear of contradiction, that as a profitable medium wool-producing animal, the improved American Merino has no rival on the globe. My friend Col. Needham, in his interesting remarks last night, gave convincing proof of that fact.

In casting my eyes down the vista of the future, I think I foresee, as already said, a few months' depression of the wool interest at the close of the present war. I also anticipate that to the end of time this and every other branch of industry will experience occasional fluctuations, owing to states of the currency, national exigencies, and variations in those natural circumstances which affect the production and sale of raw staples. But beyond such transient draw-backs—which all observing men know to be incidental to every human pursuit—I cannot, under a just and equal system of tariff legislation, discover a solitary cause for, or indication of, any permanent check to the prosperity of the wool producers and wool manufacturers of the United States.

In view of all the preceding facts, in view of the present situation of the currency, and in view of the prices of other things and the prospect of their advance should the war continue, the present prevailing prices of sheep cannot be considered unreasonable ones. Am I asked, if, after such an elaborate argument against extravagant expectations—against bubble-blowing—I am also willing to declare that my judgment approves of those extraordinary prices which have been paid for full-blood sheep within the past year? I reply: That depends upon circumstances. If extraordinary prices have been paid for ordinary animals, then the buyer has not only been deluded out of his money, but out of his anticipated improvements.

But great actual improvements justify great prices. Let me cite an example: A friend of mine owned a flock of ewes, of mixed Saxon and Spanish Merino blood, which yielded, on an average, four pounds of wool per head. He purchased what was then considered a very high priced American Infantado ram for the purpose of improving his flock. He found, quite contrary to his previous experience, that he could raise nearly 100 per cent of lambs. In the spring of 1863, his three year old, two year old and yearling ewes, numbered upwards of two hundred. Three year olds unfortunately had their wool mixed, at shearing, with that of some of the old ewes, so that their separate product cannot be determined. The two year old and yearling ewes, one hundred and fifty-seven in number, yielded 1,119½ lbs. of washed wool, or 7 lbs. 2 oz. per head, exclusive of tags; and with wool averaging over two inches in length, tagging down to the skin necessarily subtracts a considerable amount. The entire fleeces would have exceeded 7½ lbs. of washed wool per head. The sheep had been well kept, but not in the least degree pampered. The well known wool merchant who bought the wool, informed me that it was fairly washed, and that the manufacturer who worked it up expressed peculiar satisfaction with its qualities, and declared that he had never manufactured a more profitable lot. All the preceding facts, of which I am not personally cognizant, rest on the implicit testimony of well known men of as unsuspected truthfulness as any in the State of New York. To show the public appreciation of the sheep, I will add that the three year olds and two year olds would have sold last winter in a lot for $30 a head. Their dams, if put back to the same ages, would not, probably, have sold, for $8 a head.*

When we consider the gain in fleece, the gain in breeding qualities, and the gain in time over the ordinary slow course of improvement, produced by one such cross, is the highest price I have named as having been paid for rams the last year, the fine dust in the balance, when weighed against the value of an animal capable of effecting such an improvement—and this, too, even were sheep at their ordinary prices?

It is, indeed, when prices are low, that the wool grower most stands in need of improvement. When wool is high, even inferior sheep are profitable. In any state of the markets, in any situation of the tariff laws, with any amount of competition domestic or foreign, the breeders of first class sheep can sustain themselves. Their profits are fifty per cent. higher than those of breeders of what are ordinarily called prime sheep. That degree of competition, therefore, which would bring low profits to the former,

* In lamb by an ordinary ram, they would not, in my opinion, have sold for over $6 a head.

would prove ruinous to the latter, and consequently the weeding out of the latter would again give more room and greater profits to the former.

The improvement of our sheep should now be the first and greatest aim of American wool growers. We may call on the Atlas of the goverment to lend us a reasonable degree of aid, but our main dependence must be on ourselves.

I am unwilling to close my remarks on this occasion without acknowledging my indebtedness to several gentlemen who have kindly furnished me with important facts—Messrs. Livermore, Bond and Atkinson, of Boston; Messrs. Samuel Lawrence, Walter Brown and Euston & Co., of New York, and Messrs. Grinnell and Dodge, of the Agricultural Department, Washington. Mr. Dodge, who is a resident of this State, has been indefatigable in collecting the facts and statistics which I desired to obtain from the different bureaus of the government. Gentlemen, I thank you for the attention with which you have listened to my extended remarks.

SPECIES OF CATTLE, AND ORIGIN OF THE DOMESTICATED CATTLE.

SPECIES.

The *genus* to which our cattle belongs is called *bos*-ox, but the kind or species named *bos taurus* is the common or domesticated cattle.

The domesticated cattle are distinguished from the other kinds by smooth horns, generally in the form of a crescent.

The other known species of cattle are:

1. The Musk ox, (*bos moschatus,*) found in the prairies in the vicinity of Hudson Bay, from the 60th degree of northern latitude to Melville Island. This animal is of small size; it is brown, having long curly hair on the shoulders, at the throat, and on the breast. Among this long hair is found a very fine wool, of which stockings are made, which are as nice as if they were made of silk. In their wild condition, these animals live in small herds, and climb somewhat like goats.

2. The Cape Buffalo (*bos caffer*) is one of the largest kinds of cattle, having very large horns. These buffaloes live in large numbers at the Cape of Good Hope, and towards Caffraria. They are dark red, and very fleet in their motions, and have a hide so thick that a rifle ball only can penetrate it. They are dangerous animals; when irritated they run through fire and water, and fear or spare nothing. Their flesh is coarse and hard to digest.

3. The Buffalo (*bos bubolus*) is larger than our common ox, has a thicker and shorter head, and an arched forehead. The horns are somewhat compressed and long, with a slight backward curve; between them there is a tuft. The dewlap is small, and the hair thin and brownish black. It is found wild in the East Indies, where this animal is used for draught. In the sixth century it was imported into Greece, Turkey, and Italy, where it is generally kept as domesticated cattle are in the American savannahs.

The female or buffalo cow does not give a large quantity of milk, but

it is of excellent quality. During the exhibition of cattle at Paris, in 1856, Vernois and Bequeral analyzed this milk, and found it to contain much albumen, and 8.4 per cent. of butter. In comparison with the milk of the common cow, this milk has almost the appearance of cream, and as it is exceedingly fatty, many persons cannot digest it. The buffalo is adapted to draught, and develops great strength; and not only the ox but the cow is used for this purpose. These animals are very frugal, and often eat the fodder rejected by common cattle. Buffaloes are incapable of withstanding severe cold, and during intensely hot weather they plunge into any stream or body of water to cool themselves. In the East Indies a large, wild kind of buffaloes yet exist, called Arni.

4. The American Buffalo, or the American Bison, (*bos Americanus bison*,) is one of the largest, wildest, and most unruly kinds of cattle, with a manelike, curly hair about the head, neck, and shoulders, similar to those of the Auer ox. The forehead is arched, the legs and tail are short, the horns short, with a hump between the shoulders. Their color is dark brown. They are found in the warmer portions of North America, formery in western Pennsylvania, but now only in the more western and sparsely settled States and Territories.

The above named kinds of cattle in their structure, so nearly resemble the common ox and Auer ox, that they might be considered as varieties of one species, especially since it is no difficult matter to obtain fruitful offspring by breeding any one of them to the other.

5. The Auer or Ure ox or European Bison, (*bos urus, bonasus, bison*,) is one of the largest oxen, and distinguished by a curly manelike product about the head and neck, by a very broad, arched forehead, and by moderate horns situated far apart, and being curved inward and upward in the shape of a crescent. It has no dewlap or brisket, but long pending hairs at the shin, neck, and on the withers. The color is dark brown; beard and tail tassel are blackish brown.

These celebrated animals, with which even the ancients were acquainted, Prof. Mueller, of the Imperial Royal Veterinary School at Vienna, has lately published some very valuable observations made by him on a journey to Grodno in Russia, in order to superintend the transportation of some Ure oxen donated by the Emperor of Russia to the Veterinary schools at Vienna and Stuttgard. Some extracts from his work are here presented, because the opinion hitherto prevailing in certain circles that our common cattle were the offspring of the Ure; but according to these extracts it will be seen that several striking anatomical differences are found to exist between the Ure and our common cattle.

In the forests of Bialowesch the Ure ox attains the height of a large full-

grown ox of our common race, but the forepart of the body is much stouter than the hind part. The color of the young animals is uniformly silver-gray, without any marks; but when 4 to 6 years old they become blackish, and then they are most beautiful. At a more advanced age the hair begins to turn to that of a dirty fox-colored or brown, first at the head and neck, and afterward over the whole body. The winter coat commences to grow in October, and is dense as felt, and much longer at the neck and the forepart of the breast than on the rump and belly. They have a mane five or six inches long, and instead of the brisket of the common cattle, which is entirely lacking, they have a ridge of long hairs extending from the lower lip to the lower part of the breast, forming a beard at the chin. The Ure has fourteen vertebræ, and as many pairs of ribs, or one pair more than common cattle, but has only five lumbar vertebræ of which the common cattle have six. The ribs, the true as well as most of the false ones, are connected with their corresponding cartilages by several joints, and the spinal processes of the first eight vertebræ show a colossal development, being over one foot high, and thus conditioning the disproportionate height of the forepart of the animal. The number of the caudal vertebræ is less than in domesticated cattle; the shoulder blades are broader, the upper arm and fore arm bones much thicker but shorter; the pelvis is proportionately narrower, the hide is very thick and strong. The reticulum has hexagonal cells similar to that of the domesticated cattle, they consist of two parts only, but any further subdivision is not apparent, and the cells are much shallower. The kidneys are small, and the lobes are not as strong as in domesticated cattle.

But the genitals of the male present the most remarkable difference. The testicles are proportionately small; over either there lies an accessory testicle extending into a narrow seminal vessel, which appears expanded by a layer of glands at the surface of the bladder, and empties together with glandular seminal cells, although very little developed, in the orifice of the urethra. In the old Ure, there was found in the midst of the two seminal passages, vessels, a single duct, shaped somewhat like a bag, one inch in diameter and four and a half inches in length, which is divided in front and at the top into two arching branches, like the horns of the uterus of the cow, extending as channels of 3 to 4 inches in width to the testicle, and there terminating in a cul-de-sac. This consists externally of a tegument of the outer skin as far as it lies in the cavity of the belly, then follows an envelope consisting of muscular fibres, and at the inside there is a membrane covered with epithelium, without distinctly visible glandular apertures. The whole bag, with its two branches, contains a thickish mucus fluid, somewhat resembling semen, yet showing no trace of (seminal) cells, but consisting only of granular cells of a regular form.

This bag terminates in the orifice of the urethra, at the elevation in the middle of the apertures of the seminal duct. This middle bag can not be considered to be anything else but *uterus masculinus*, first discovered by E. F. Weber in other animals and in man, being in the *ure* of such a proportionately colossal size as has hitherto not been found in any other animal. Whence the immense amount of matter contained in it originates, and what function it performs, could not be ascertained. The *uterus masculinus* is also found in the domestic cattle, in which it forms only a small bladder of about the size of a bean, terminating in ducts in the orifice of the urethra.

The pregnancy of the Ure cow lasts nine months, (not seven months only, as was stated in the "Isis," 1831, No. 4; and, therefore, the common cattle can not be descended from the Ure. The Ure grows until he is eight years old, and may attain to the age of forty years. If bred to the domestic cattle, the offspring is fruitful, and several favorable crossings have taken place in the vicinity of the Bialowesch forests, since it was supposed that a race of powerful cattle might he produced in this way, and for that region. Such crosses produced there of late are said to be of a beautiful form, quite tame, very courageous and powerful.

6. The domestic or common ox (*bos taurus*) is found all over the world, but was introduced into America from Europe. He is domesticated everywhere, and variously degenerated.

In the East Indies there is an ox similar to him, and of the same size, being called Gayall or Gyall (*bos frontalis.*) He is brown, with a gray streak on the forehead and back, but the feet and end of the tail are white. He lives in a wild state upon the wooded hills in north-eastern portion of Bengal, and prefers the young branches of trees to grass; he is very courageous, is much easier tamed than the buffalo, is adapted to the draught, and the cow gives a considerable quantity of milk. If paired with the common bull, she produces a fertile offspring.

The zebu (*Bos taurus indicus*), according to Buffon, is said to be a descendant of the Ure ox, but according to others, of the domestic cattle. This ox likewise possesses thirteen pairs of ribs. The zebu has one or two humps on the back, which, according to more recent investigations, do not consist of fat, as was formerly supposed, but are nothing else than the peculiarly and largely developed muscles of the shoulder blades. The zebus are mostly gray or white, but there are also red and speckled, small and large, horned and hornless ones. They run as fast as horses, and are, therefore, used as roadsters. They form the common cattle in all India, Persia, Arabia, Madagascar, and Africa. They are shod and harnessed like horses, and are led by a line drawn through the partition wall of the nostrils.

Their flesh is not as good as that of the domestic cattle with which they are bred. The hump vanishes entirely after several generations have been interbred with the domestic cattle.

7. The grunting ox, Yak (*Bos grunniens*) has likewise a hump between the shoulders; he has long hair and a tail like the horse, containing many fine, silky hairs. He has a thick mane along the back, and the flanks and sides of the belly are covered with long, bushy hairs, spread over half the length of the legs. He has fourteen pairs of ribs, utters a monotonous grunting, and is found in Thibet and China, where they are kept in large numbers. The meat is excellent. He is not well adapted for work. His hair is manufactured into shawls. The tail is used as ornaments of the Turkish standards.

From the above it appears that the origin of the domesticated cattle and their original native country is, as yet, not fully ascertained. Formerly the ure was considered the parent of the same, but this is improbable on account of the anatomical differences between the ure and the common cattle. Bones of an ox, somewhat larger than the common ox, but otherwise bearing a striking resemblance to it, have been found deeply imbedded in the earth. In this case the common cattle were thus a special kind, and their ancestors extinct in Europe. As far as the accounts of history and zoological analogy go, several species of cattle have always been domestic animals, which are often mentioned in the Bible, as well as by secular authors, but their native country is Asia.

DEFINITION OF RACE, TRIBE, KIND, ETC.

When the numerous specimens of cattle in the different climates and on the different soils are more closely examined, they present many internal and external differences. These differences have ever led to a division of the cattle extant into various groups—*races*, *tribes*, *kinds* and *varieties*, in order to comprise all that is homogeneous under one head; and on the other hand again, to examine and describe each separately. We retain the old divisions, but will give here the following definitions of race, tribe, kind, &c.

The *species cattle* is first divided into *races*. By *race* we understand a number of animals of the same species distinguished from others, *a*, by the same form of body, size and color (external appearance); *b*, by the same qualities in respect to their usefulness and productions (internal worth and character); and *c*, by the power or ability of transmitting these peculiar qualities, external and internal characteristics, to their offspring. These qualities combined form the *character*, or *type of race*.

Those peculiar qualities have originated, in the course of time, from the

original animals extant and the effects of natural influences—soil, climate, nutriment and local conditions. The *Podolish-Hungarian cattle* is supposed to be the only pure original race yet existing.

Tribe is a subdivision of race. A race is generally divided into several tribes. The animals belonging to a tribe possess a definite equality in respect to their internal and external characteristics—form, size, color and useful qualities, as well as those belonging to a race; yet in each tribe there may be found qualities peculiar to it, by which it is distinguished from other kindred tribes. It likewise possesses the capability of transmitting these characteristics of the tribe to its descendants. The peculiarities of the tribe are formed by other conditions of the soil, climate and locality, and also by special artificial influenees, such as the methods of feeding, keeping and using the animals. Instance:—the cattle tribes of the Ukrane, Moldavia, Vollhynia, Wallachia, Crimea, &c., all belong to the Podolish-Hungarian race, and in a strict sense, they represent, with several others, the whole numerous race. Instances in detail:—the Montafan and All-gau cattle are individual tribes of the brown-gray mountain race, as representatives of which the Schwyz cattle is to be considered.

Kind or breed is a further subdivision of (the) tribe, and is to be considered from two points of view.

In the one case a tribe may be divided into many kinds, which have been formed through specifically different conditions of the soil and methods of feeding and using the animals, or by the particular fancy or tendeney of breeding pursued by the owner, in regard to the form, color and purpose for which the animals are to be used. Therefore the natural breeds are mostly found at the boundary lines of the territories in which the races or tribes are generally spread, where the specific influences just named have a more powerful effect than in or near the central points. Such kinds of animals may still possess the same peculiar form and size, and also the useful qualities, and power of sure hereditary transmission as the original stock animals. Instance:—the cattle kind of the Cossacks at the Dor and Kubar, of Astrachan and the Volga districts, are always kinds belonging to the Podolish-Hungarian race and tribes already mentioned. On a smaller scale, the so-called Cloisterdale and Walsdale cattle form two breeds of the Montain tribe. At the furthermost line of the territory where they are at home, and when transferred into territories naturally less suitable for them, the type of the tribe may gradually be changed, and the certain hereditary transmission of their qualities be impaired, according to the unfavorable local conditions and a less suitable system of feeding and using the animals, so that their value for further

breeding in-and-in, or a crossing for certain purposes with other races, is at least very problematical.

Such breeds are often very difficult to classify, because, according to their peculiarities, they may be numbered among several tribes or breeds.

The formation of a *kind*, or rather breed, may also take place in another way, namely, by the *intermixture of the blood of animals of different races*, or in other words, by cross breeding. When individuals of different races or tribes are bred together, the result will be mixed productions, *mongrels* or agricultural *bastards*, which are only half-bloods in the beginning, but gradually, if bred together continually among themselves, they will in the course of time assume a fixed type. If such crosses are bred in a certain tendency, and fed, kept and used for certain purposes, it is much easier to produce animals in larger numbers, which will possess a fixed type of breed after the lapse of a certain period of time, but temporarily only; for animals of such breeds will lack, in their first generations, the capability of transmitting their qualities with certainty; and hence the opinion that animals belonging to a particular kind, do not possess the power of certain hereditary transmission, and, therefore, are deemed less valuable for breeding purposes. But, after the lapse of a period of time, a breed formed in this way will attain constancy in the hereditary transmission, and this the sooner and more certainly the more the production of the new breed is furthered by a systematical method of breeding, keeping, feeding and using the animals, and by a favorable soil and climate. From such limited breeds very extensive kinds, and even tribes and races, may originate in the course of time. Instance:—the *Triesdorf* resp. *Anshach* tribes, and almost all of the recent English breeds of cattle. But if such amalgamations of tribes occur among the animals *ad libitum*, or are not judiciously regulated, or if they are not kept fed and used for that purpose, such animals will not retain their fixity or permanence of type for a long period of time, and a constancy of certain hereditary transmission can scarcely be expected from them. Instance: Many poor breeds of so-called native cattle, in which the mongrel character will always be presented.

Finally, by family is understood the near related offspring of one and the same pair of parents which were continually used as breeders among themselves.

Instead of family, the term *cattle staple* may also be used, and is used, locally however, in many parts of the European continent.

By a continued breeding in the family according to properly applied principles of breeding, distinct breeds may gradually be produced.

What is understood by *intermediate tribe* or *race*, is apparent from what has been said on tribes. This term designates such tribes as have been

produced by the continued amalgamation of two or more races, tribes or breeds, and thus possess the qualities of them in common.

Lastly, a VARIETY presents striking variations only from any type of race, which appear like freaks of nature, and sometimes are constantly transmitted, so that if such animals are consistently bred among themselves, distinct breeds may successively be produced. Such varieties are represented by the so-called polled breeds cattle of England and other countries.

ORIGIN OF RACES.

The development of animals is dependent upon the soil and local conditions where they live. Vegetation on which cattle must live, depends on the condition of the soil, moisture and climate; and on this—the nature of the soil, the prevailing temperature and other things—all animals, and also cattle are depending as long as they live in a free state of nature, wholly independent of the influence of man.

All races of cattle formed in this way are thus to be considered *natural races*, in contradistinction to other races whose peculiar qualities were produced by artificial influences, and which, therefore, may be designated as *cultivated races.*

Origin of natural races.—It remains, of course, uncertain whether our domestic cattle, when they gradually originated among the order of creatures, were equal at all places where they were created, and were changed successively, or whether they presented different characteristics from the commencement? Be that as it may, this much is certain that in the long period of time which has elapsed until our day, they gradually assumed, through external influences, the various properties shown at the present day. The soil, climate, nutriment and other things, certainly exerted their influence upon the formation of natural races.

The *soil* has an influence upon the formation of races, in so far as every where on good, fertile and sufficiently moist ground, there will spring up a luxuriant and nutritive vegetation, securing during all seasons a wholesome and suitable nutriment for the animals existing there. Where there exists such a vegetation, large, powerful cattle originate, which will fatten easily and produce much milk. But a dry, sandy soil will produce a smaller number of plants, and few varieties only; they are generally not sufficiently nutritive, and hence in such regions there are found small and light cattle excelling neither by their copious production of milk, nor their fattening qualities. The nature of the soil exerts a very great influence, so that animals living in an uneven, mountainous country, possess more powerful limbs, and are more agile and enduring in their locomotion; further, they have well-developed lungs, so that their functions are appropriate to

the movements of the animals requiring greater exertion. But animals living in level countries have less powerful extremities, not well adapted for running; even short marches will make them tired, and their breathing difficult; because their locomotion on the level soil required no great exertion of the extremities and lungs.

Heat and *cold* exert a great influence upon plants and animals, and, therefore, as a necessary consequence, upon the formation of particular races. Animals of the same species living in different climates often present considerable differences. In hot climates, the animals remain smaller and possess the so-called dry structure, because their organization is formed of fine compact bones and powerful muscles, but produces very little fat. Animals imported into this climate from regions of a temperate climate will change in respect to skin and hair as well as to color and instinct. In the hot climate of Cuba the cattle have thin hair and often are entirely bare, and the imported dogs have become brown and smaller. The geese and hens lay smaller eggs, (Rowlin). In Syria, the cats, rabbits and goats have very long and soft hair; in Corsica, the horses, dogs and other animals become speckled; in Paraguay our domestic cat, since its importation 300 years ago, has become smaller, the trunk much thinner, the limbs more puny, the hair shorter, more glossy, thinner and lying close to the skin. It seldom pairs with freshly imported specimens. In the Paraguayan sheep the character of the Spanish sheep has wholly disappeared; they are smaller, the wool short and very rough, and the mutton lean and white, But the influence of the cold climate at far north or on high mountains is apparent in the small size and mostly compact form of the animals, a change of color, harder skin and thicker hair. The hogs of the Paramos have curley hair, and the wild cattle there, living at an elevation of 7,500 feet, have a thicker skin than those in the valleys. The African house dogs are hairless, or have thin hair only, but when transported in more northern climates, hair again appears on them after several generations.

The amount of vapor in the air and the dryness and moisture of the soil, likewise have a powerful influence. The atmosphere always contains vapors, a proper amount of which is necessary for animals. But when it is in too limited quantities, plants as well as animals, obtain too little of it, and the consequence is a too copious perspiration through the skin, but for the former, a defective development causing a want of proper nutriment for the animals. The plants and animals of moister countries and regions excel those of drier climates by their more rapid growth and larger size. Even the hair of many animals becomes coarser and rougher in wet climates; hence very fine sheep gradually lose their fineness of wool. A larger amount of moisture is necessary for cattle which thrive well in

wet climates, as is known to be the case in the countries bounded by the North Sea, and many mountains where the atmospheric precipitations are copious.

The organization of animals depends on these influences, and when they are not changed in the course of time, the external and internal characteristics of the animals must remain constant. Thus it is explained why countries enjoying the same climate have the same or at least homogeneous native animals.

But cattle transferred from one region into another where the influences are different, will immediately change their exterior and interior characteristics, and this for the better or worse, according as the new place of abode is more or less conducive to their well-being than the former; and even smaller differences of climate exert a visible influence upon animals living in a state of nature.

The original native country of animals is considered to be the *natural area for their spread or propagation*, allowing, of course, in its centre or at several places the most perfect development of the race in question. Such a natural area is of different extent; either it forms a contiguous territory, or is sometimes separated by intervening areas in which other races are spread. The boundaries of these areas may be divided into *horizontal* and *vertical*. The former are northern and southern, and the latter ascending, mostly pretty well defined. At the periphery or the boundary line of other regions of a different nature the perfection of the races will disappear, and the purity and beauty of the races will be impaired, and other forms originate, as mentioned on a preceding page.

But in their native countries the characteristics of the natural races are often the more difficult to efface through the artificial influences of feeding and keeping, the older these races are. It is scarcely possible wholly to efface all those interior and exterior characteristics, or when the attempt is successful, it is only for a short time or in individual cases, and the original soon reappears.

PRODUCTION OF ARTIFICIAL, OR SO-CALLED CULTIVATED RACES.

With the improvements in agriculture and cattle breeding, an attempt was made to establish new races; and more recently the English have in an eminent degree succeeded in producing races, or rather tribes and breeds, fully adapted to the various demands of agriculture and national economy.

Through a proper and judicious system of feeding and keeping cattle, it is almost always possible to a certain degree to protect them from the un-

favorable influences of the climate, and to produce upon the same soil and under the same climatic conditions, tribes of animals of a different form and structure. By a constant system of in-and-in breeding, or more especially by a properly regulated method of crossing, or by the breeding of animals according to a definite plan; thus by a certain kind of food of a certain chemical composition, given in larger or smaller quantities, by giving more voluminous or concentrated food, in a wet and prepared, or in a dry and natural state, man may exert a very powerful influence upon the production of certain definite animal forms and their useful qualities. In this respect astonishing results may be obtained within a short time, by keeping them warmer or cooler in stables, or wholly in the open air, by keeping them alternately, at the proper times, in the stable or on the pasture, and by employing all available means to establish a certain desired useful quality.

In the natural way, namely, by the uninterrupted natural influences upon the animals, new races are gradually formed only when the animals migrate into regions of a different nature, but artificial races are produced in a much shorter time, if the soil and climate are not too unfavorable to the plan pursued; for every impediment is removed, and every thing employed conducive to the development of the animals for the purpose of attaining certain desirable qualities. As the sculptor, in clay or stone, &c., forms his ideals, so likewise, the rational breeder will succeed in gradually producing animals of different forms and nature, if he is able constantly to fulfill the conditions necessary for that purpose. In this respect, the doctrine of animal production has of late justly been termed "*zootechnics*." The breeder may, to a certain degree, overcome the climatic influences in producing certain animal qualities, if he persistently pursues a definite and correct system of breeding, and possesses protecting stables, suitable pastures and food and fodder. But if the one or the other factor is disregarded or entirely absent, he will be less successful; and finally, if every thing is left to nature, all the various tribes will soon present but *one* type, namely, that produced by the existing natural factors; for man can never overcome nature, but attain great results only when he understands her laws, knows how she works and changes, and constantly observes and follows her operations.

From this point of view, the long continued dispute may be considered as decided, as to whether the climate alone exerts its influence upon the formation of races or tribes, which many deny altogether, and are inclined to hold the formation of races to be dependent solely upon the option and action of man.

METHODS OF BREEDING.

IN-AND-IN BREEDING AMONG FAMILIES.

The term "in-and-in breeding" signifies the pairing of the nearest and nearer kin in one and the same family.

In-and-in breeding is the means of preserving unchanged, or cultivating the type of those two animals paired together at the beginning, for the reason that generally either animal transmits its peculiar qualities to its progeny, and this receives, by hereditary transmission, the qualities of both the parent animals. If the animals produced in this way, after reaching the state of maturity, are again paired exclusively with their sire or dam, and afterward the sisters and brothers, and so the following generations are again paired with one another, the original type of the stock animals must be preserved in a uniform manner, provided that external influences do not impede the growth and development of the animals.

By in-and-in breeding, if the new productions are consistently paired together, the tribe is produced, and nearly all tribes of recent times originated, or are originating in this way from a single one or several pairs. The celebrated breeder Bakewell, in founding his famous race of cattle, is said to have adopted and perfected the method of in-and-in breeding; the same plan was pursued by the brothers Collings.

Although the pairing among members of families has great advantages, yet if the pairing of the nearest member of a family is continued through several generations, or for too great a period, and the animals are not selected with proper care, this system will be found to have corresponding disadvantages. The effects and the advantages and disadvantages of in-and-in breeding are, as yet, not fully understood, and therefore we shall enlarge somewhat on this subject. Sinclair, years ago, pointed out the advantages of in-and-in breeding, but he did not deny that if it was continued too long, imbecility and barrenness were the unavoidable consequences.

That in-and-in breeding among *hogs* causes a decrease in their prolificacy and a poor development in their offspring, has of late been shown, especially in the breeding of English races; and still more recently Rhode, in his essay "on the nurture and use of the domestic hog," (Greifswalde and Leipsic, 1860) says that the breeding of blood relations is very objec-

tionable. A long continued pairing of the nearest members of families among sheep, has injurious effects, and it has even been considered to be the cause of the vertigo.

Nathusius adds to his monograph on "Shorthorn Cattle," (Berlin, Bosselman, 1857) an appendix on in-and-in breeding, or pairing of near relations, in which he states the following points in regard to his system of breeding:

"The breeding with the nearest blood relations, especially among cattle, must often be re-adopted whenever it becomes necessary to establish certain qualities in breeding animals, and to produce higher degrees of improvement.

"But great precaution is required, because a long continued in-and-in breeding has often produced barrenness and debility in the offspring.

"In general, therefore, in and-in breeding should not be adopted in large herds, or among common working cattle, since among them such a minute observation of the individuals as the breeder of the improved race of animals must exercise, would actually be impossible."

Justinus, in his "Principles of Horse Breeding," says that those breeders are sadly mistaken who believe that unconditional in-and-in breeding produces more perfect animals, but, on the contrary, it becomes injurious if the breeding animals are defective. In respect to the in-and-in breeding of cattle, we append the following views:

David Low says, in his "Practical Agriculture,"—"This system has its limitation; for nature will not conform to our combinations if they deviate too far from the usual way. It is a well-known fact that by the pairing of near relations, the volume of the bone decreases and fattening qualities increase; but on the other hand, the productions are much more delicate and subject to diseases. Therefore, if these combinations are continued with very excellent animals to a certain point, in order to insure constancy in the hereditary transmission of their qualities, we commit an act of violence against nature, if we go too far in this respect. The race possesses the advantages of early maturity and of fattening sooner and more easily; but they lose their vigor and energy, the females do not give the requisite quantity of milk for nursing their young, and the males lose their procreative power and capability of propagating the race. Many breeders have sustained great losses by carrying in-and-in breeding too far, for the purpose of bringing a race to the culmination of perfection.

Settegast, in his paper "On Breeding," says: "The injurious consequences of in-and-in breeding are not so great and striking among cattle and horses as among hogs and sheep, but they must prove pernicious in the end."

H. von Nathusius, in his "Views on Breeding," (Stockhardt's Agricul-

tural Journal, 1858) says: "Where such in-and-in breeding in families has been continued for many generations without any admixture of other blood, not even of the same race, some individuals, even of the same litter, will always be of greater, others of less value for use and breeding; nay, by an exclusive in-and-in breeding in families, if proper attention is not paid to a deviation from the general direct stream of blood, if no lateral branches, having for some time been bred in another direction, are taken in, it will often happen that the relative value of full sisters and brothers is the more unequal, and the hereditary transmission of their qualities the more insecure, the more the blood of the family has been preserved and concentrated.

Ed. Bawly, in an article "On the breeding of cattle," (Wilda's Central Journal, 1858, vol. II.,) speaks as follows: "As to in-and-in-breeding among near relations, it undoubtedly is safer in regard to the production, but if contined for more than one or two generations it becomes objectionable, for although some greater perfection of form may be attained, yet the size will decrease and the constitution become debilitated.

John Sebright instituted experiments with different animals, and always found the disadvantages above mentioned recurring.

H. W. Von Pabst, in his "Instruction in the Breeding of Cattle," says: "Although we admit that animals faultless in every respect are often not found at all in the smaller tribes, and that the cause for hereditary defects are often overlooked in the beginning, yet there are many reasons why great precaution should be exercised in pairing near blood relations, especially in its repetition, and it should be avoided altogether, if this can be done without frustrating the purpose of breeding. I must acknowledge that, in order to produce animals that would give the largest possible quantity of milk, I have repeatedly paired near blood relations, and, in doing so, have not paid due attention to the somewhat neat frame of bones and narrow chest of the animals paired together; the result was that I soon obtained productions of such a debilitated constitution as to fully convince me of the disadvantages of breeding among relations.

In order to show the analagous effects of sexual connections also between members of the human family of too near kin; two statements are presented. In Hasses' paper "On Suicides," it is stated: Among seventeen families whose parents were cousins to each other, there was one with five idiotic children, five with four each, three with three each, two with two each, and six with one each. These seventeen families had altogether ninety-five children, of whom forty-four were idiotic, twelve scrofulous and imbecile; in the whole, fifty-eight of a weak constitution and poor health. The French physician, Dr. Devay, says that among one hundred

and twenty one marriages between blood relations of his acquaintance, no less than twenty-two were wholly barren; in seventeen cases the children had more than ten fingers, in two the small finger was lacking, in five others there were club feet, and in all the rest of three cases the state of health in these children was only tolerably good. The children of near blood relations are often deaf and dumb, they generally teeth later, and the development of their mind and body is retarded. The nearer the parents are related together the worse are the consequences.

The cause of the degeneration of the offspring of animals by the pairing of near blood relations may be explained in the following way. Although the exterior of an animal may appear to be perfect, yet it may have a hidden defect or some disease in its organization. Frequently the members of a family show the same defects of forms which are hereditary, but less apparent in the individual. By pairing such blood relations the abnormity, although insignificant in the individual is thus doubled, obtains a double development in the offspring, and in this way the predisposition to disease or the disease itself originates. By breeding within families there is less probability that the imbecility of the one animal will be counterbalanced and equalized through the power or vigor of the other, or the excess on the one part through the deficiency on the other, than by pairing animals not related.

IN-AND-IN BREEDING AND THOROUGH BREEDING.

Thorough breeding, in the strict signification of the term, signifies breeding among more distant relations, while in-and-in breeding among families means the pairing of near blood relations. Thorough breeding pairs animals of a larger family or a breed, excluding any admixture of kindred breeds; as for instance the breeding together of the several families of the Short-horns. The German breeders make three systems of breeding, viz: In breeding, in-and-in breeding, and pure breeding—their pure breeding is equivalent to our thorough breeding, as will be seen by the following paragraph:

"Pure breeding pairs the animal belonging to one tribe, excluding none of the several kinds of the same. This method of breeding, therefore, aims at preserving the purity of the tribe. Instance: the breeding between Montavon, Cloister Valley and Walser Valley cattle, the two latter being breeds of the Montavon tribe."

The object of in-and-in and thorough breeding is the unchanged preservation of the properties of a breed or tribe of cattle which fully answer the purposes for which they are used. If the external influences—feeding, keeping, use, climate, &c., are adapted to the nature of the tribe, those

two methods of breeding are the means of preserving the same in their principal type.

In-and-in breeding, as well as thorough breeding, may yet attain to a higher degree in this respect. But in-and-in or thorough breeding succeeds not only in preserving the tribe or breed unchanged and pure, but it also effects gradually an improvement of the animals in respect to their usefulness for the one or the other purpose or even for all purposes, and also in respect to form—thus an improvement in the true sense of the word; and likewise an increase of volume to a certain degree. If only the finest and largest specimens of cattle, which answer most fully the purposes of the breeder in developing one or more useful qualities, are selected for breeding, and the inferior animals wholly excluded from breeding, and besides, if the feeding, keeping and use of the animals correspond exactly to those special purposes, the beauty, size, and usefulness of the tribe or breed may be improved almost *ad infinitum*. In this way any, even the most inferior tribe of cattle, may be improved, without introducing strange male animals, &c., and without incurring the danger of injuring the tribe more or less by the admixture of new blood. If the people have not ample means to invest in the breeding of cattle, and if the animals are bred, kept, and used according to correct principles, this method of breeding may be deemed preferable to the introduction of blood from other races, for the purpose of improving whole tribes of cattle.

Yet, in the face of these facts, some have declared in-and in and thorough breeding objectionable, contending that it leads inevitably to a depravation of the tribes or breeds. But this objection is wholly unfounded, if this system of breeding is pursued rationally; and if irrationally, this objection does not apply to the system itself, but to the method in which it is executed. Of course, if breeding among near relations is carried on too long, or if defective animals are continually paired together, the offspring must lose in vigor, perfection of form and usefulness, and the tribes rapidly degenerate by in-and-in or thorough breeding, and therefore such erroneous proceedings should be discontinued. The views just advanced is fully corroborated by Pabst in the following communication:

"As an instance of a long continued and very successful in-and-in breeding, I mention the fine tribe of the Gurten cattle, numbering at most twenty head, which for a long series of years has been established on the Royal stud farm of Kleinhohenheim, in which in-and-in breeding has been carried on at least during a period of forty years, and where the pairing of blood relatives was inevitable. This tribe is as powerful and useful to-day as when I first became acquainted with them, twenty-eight years ago; but faultless animals only were used for breeding." (Directions for the breeding of cattle.)

CROSSING.

By *crossing*—amalgamation of blood or races—in the more limited (agricultural) sense of the term, we understand the pairing of animals of different races or tribes, e. g. of the Shorthorn and Devon races of cattle. But in common practice, pairing among the kindred breeds or tribes of *one* race is also considered a crossing. This view is not objectionable, either, since a commixture of two different kinds of blood takes place. The productions of the crossings mentioned are called *bastards*, (mongrels) according to the agricultural doctrine of breeding, but in the sense of natural history, a bastard originates only from the pairing of different classes and species of animals, and is generally unfruitful, as, e. g. the bastard between the ass and zebra; but the productions obtained by the common crossing, the pairing among races, tribes and breeds, are always fruitful.

By crossing, the various properties of two or more races, tribes or breeds, may be combined and preserved in the productions originating from such a commixture of blood. In pairing animals of a badly built race with those of a well built one, the first productions, as to their structure, must be a medium one between the two races. The same is true in respect to the earlier or later development and the useful qualities of the animals. If all the conditions of a successful crossing are secured, it becomes *the* means of producing a larger size, a better form, and more useful qualities of establishing a new breed pretty surely, and sooner than it can be done by in-and-in or thorough breeding.

But to cross successfully, the following points must be observed, otherwise success and final results will be problematical, or at least retarded:

1. The animals must not differ too much from each other, or be too heterogeneous in size and form, their anatomical proportions, or in color and qualities. If too large and small, too short and long, too high and low built animals are paired together, the productions are generally deformed, and if the color of the breeding animals is too different, an unpleasant combination of color will result, which will not assume a fixed type in the offspring, but always change. The old rules in cattle breeding, "Pair like to like," or "like paired with like produces like," hold good here to a certain extent, otherwise a crossing should never be undertaken. Now, as the many various races are very different as to form and color, so they are heterogeneous in their interior structure, which is not externally so apparent. Experience teaches that certain individual tribes, being not very heterogeneous in size and form, will not amalgamate easily or never successfully, so that their offspring will always more closely resemble the one or the other of the parent animals, and not stand, as to their *forms* and properties, between both. Families, kinds breeds and tribes of *one* race will generally commingle more readily than those of different races.

Where crosses between breeds of cattle, of which successful crosses are not yet known, are intended to be made on a large scale, prudence demands to institute at first experimental crosses, lest money, time, feed and labor be wasted.

2. The male animals to be selected for crossing, if the breeder aims at definite characteristics of the race, must possess purity of race and constancy, or an extraordinary individual power of hereditary transmission; otherwise the results of this system of breeding will be of little value or uncertain. Animals descending from breeds or families not long established themselves, and not possessing a fixed type, will not always transmit their properties with certainty, but ancestral defects will often reappear. Bulls taken from the boundary line of a territory where a certain breed of cattle are spread, are not to be commended for crossing, because they do not possess the power of transmitting their properties with certainty, on account of their mixed blood and not fully established constancy.

As to how long it will take cattle produced by crossing to obtain a fixed type and the perfect constancy in transmission of it, an annual meeting of the Agricultural Association of Scotland held at Inverness some years ago, gave the following interesting data:

Harvey, of Tillygreig, said that in breeding Durham cattle, a case occurred to him where a bull-calf had been dropped in the eighth generation which, on account of its black and white color, could not be registered as a Shorthorn in the herd-book. Grant Duff, of Eden, one of the most prominent breeders in Scotland, stated that he produced a perfect hornless Angus bull by the sixth crossing of the hornless Angus cattle with Shorthorn bulls. A Mr. Horne, and several other rational breeders gave it as their opinion that a head of cattle with only one crossing in its pedigree, could never be acknowledged as a full blood animal; and while others did not venture stating their views as to when cattle crossed with Shorthorn bulls would possess so much of Shorthorn blood as to be considered full-blood Shorthorn cattle, all present agreed that purity of blood in the male animals used for crossing is the chief condition for a successful and proper crossing, and that since the first cross excells all the following ones in valuable qualities, a second crossing should be attempted in exceptional cases only.

3. The food for cattle to be formed into a new tribe, must not differ too much in quality and quantity from that given to the animals from among which the breeding animals were chosen; for otherwise the useful qualities aimed at and found in that tribe from among which the breeding bulls were selected, can not be fully developed. The same rule applies to the manner of keeping and using the animals. He who believes to be able to

make small cattle heavier and better with scanty feeding, by merely crossing them with bulls of a larger kind, of better milking or fattening qualities—which absolutely demand a better feeding—will surely wait in vain for permanently favorable results from his procedure, but will injure his original stock instead of improving them.

Crosses may be instituted for various purposes. They may be:

1. *A regular and constant crossing*, the object of which is to establish a new tribe. In cases where the present stock does not meet the demands of the owners, and the necessary means for procuring a new stock are wanting, the breeders, if they always exclude their own bulls from breeding, procure bulls from the tribe with which the crosses were commenced, may gradually exterminate the original type and supplant the tribe introduced, even to a small fraction of its totality.

2. *A merely transient cross.* If an in-and-in bred tribe lack the one or the other desirable qualities in regard to form, size or usefulness, &c., which are hard to acquire, or only after too long a period of time by in-and-in breeding, these properties may often be acquired safer and sooner by crossing them for one, two, or three generations with suitable bulls of another race.

3. *A variable cross.*—If certain points in respect to form, maturity of development, or useful qualities, can not be attained by an amalgamation of two different races, it may sometimes be accomplished by again crossing the tribe already mixed with a third race, or by a combination of three kinds of blood. This method has long since been pursued by the English, and in more recent times adapted by the French; extraordinary success has resulted from it which could not have been attained by a single admixture of blood. As early as 1856, at the great cattle show in Paris, excellent productions of such double crossing were exhibited; for instance: of the Durham, Swytz, and Normandy races. It was attempted to improve the Normandy race by Swytz blood, and in order to obtain fine bones, a rapid development, and better fattening qualities, an additional crossing with Durham bulls was resorted to. In France such double crosses have been instituted with the Durham, Holland, and Flemish races, and also with the Durham, Ayreshire and Breton races. Of course, the last mentioned double crosses requires a thorough knowledge of the races, and great caution as to the selection of the animals and the length of time for which it is to be carried on; for otherwise it must prove injurious.

Finally, as to the question how long a cross once commenced is to be continued, no general answer can be given, but this depends on various influences and circumstances. If the crossed races are originally near akin (of a homogeneous nature), the object aimed at will always be accomplished

within a shorter space of time. Besides, the more feeding, keeping, and use made of the animals are conformed to the natural condition of the new tribe, and the more favorable the climatic influences are, the sooner the crossing may terminate. But if the contrary is the case to a greater or less extent, it will take more time to produce even less perfect specimens, and a much longer period of time will be required to firmly establish the desired qualities in the offspring. Yet the crossing must always be continued till the productions have attained to a somewhat higher degree of improvement than was at first intended. A gradual deterioration of animals of mixed blood in their forms and qualities may generally be expected; but by pursuing the method just named, the desirable properties may be conserved for a long period of time.

The majority of rational breeders still contend that in any, even long continued crossing, a fraction of the common blood of the original tribe expressible in figures, will always remain in the improved animals, according to the amount of which reappearances of ancestral defects or back breeding may be expected in the future. The calculable process of improvement in a tribe is stated at the end of this paper.

From this it will be seen that great results may be derived from a cross on a small scale, if rationally managed, and if the necessary means for purchasing and proper feeding of suitable animals are provided. But to improve whole breeds and tribes requires very great care and a large sum of money, therefore crossing should take place to a limited extent only.

Crosses instituted and managed according to rational principles, and constantly aiming at fixed objects, are very advantageous and profitable; but, on the other hand, the disadvantages resulting from senseless and irrational mixtures of blood are very great and injurious. It frequently happens from ignorance that unsuitable animals of different tribes and breeds are bred together; now as these animals are heterogeneous to each other, and possess the defects of both tribes or breeds; and furthermore, since these admixtures of blood do not receive the proper attention in the feeding, keeping, and use of the animals, worthless productions of a bad form and color, and little utility will result. Any one directing his attention to this subject can not fail to observe the numerous defective animals possessing unpleasing shades of color, all the defects possible in their form with scarcely any useful qualities. But as in such an irrational method of breeding, these half-breed animals again are paired *ad libitum*, or being paired to one another, the results must grow worse and worse, and thus the families, breeds, and tribes of cattle must gradually deteriorate. It is this method of crossing against which rational breeders have always contended and must still contend for a long time. As to the ignorance alluded to, from

which such a pernicious method of breeding originates, we will quote here the words of Wolstein, the venerable instructor at the Veterinary School of Vienna. In his book "On Diseases of Cattle," 1789, he says: "The farmer only who raises grapes and vegetables is instructed in his business, but the farmer who raises cattle knows nothing. He can not distinguish the breeds and tribes; he does not know what are bastards, or improved animals, or originals, "&c.

But frequently false parsimony and unpardonable indifference are the causes of such senseless pairing, and often the finest and best tribes of cattle are thereby ruined. This ought to be severely reprimanded, since such bad examples may be followed by others. Against this method followed even for a short time, the following experiences may serve as warnings.

It has often been observed in horses, hogs, and sheep, that the first impregnation of the female determined, to a greater or less extent, the character of the ensuing progeny. In the dog cases are on record where the first impregnation evidently had an influence upon the two ensuing conceptions. These experiences have been doubted by some, from the fact that in the human family it has been observed that adulterous wives bore children resembling their legitimate husbands; hence the proverb: "The child of adultry palliates the mother's shame;" but this only goes to confirm the observations in inferior animals above stated. There have also been cases, doubted by some writers, yet positively asserted by others, where widows having had children by their first husband and living happy with the second, bore children by the latter strangely resembling the former.

Several special cases of the so-called *infection of the cow by the first impregnation*, are stated in Fuchs' Pathological Anatomy of Domestic Animals, which we will insert here.

James McGillavary, Veterinarian at Hantly, in the Aberdeen Journal, says: "When a cow of the pure Aberdeen race is covered by a Shorthorn Teeswater bull, the blood of the cow becomes the more changed, the more the calf resembles the bull, and afterwards she no longer produces a calf of pure race or blood. It is apparent that the great variety of forms in herds is chiefly owing to this admixture of blood in the cow through the first bull covering her. A cow of the Aberdeen race was covered by a bull of the pure Teeswater race, and she bore a calf being a cross between the two races. In the following year a bull of her own race was brought to her, but the calf was likewise of a mixed race, and when two years old had very long horns, although both its parents had very short horns. In 1845, another young Aberdeen cow was covered by a bull descending from a cross between a cow crossed with a Teeswater bull. She brought forth a mongrel calf; and when afterwards paired with a bull of her own race, she likewise bore a cross calf so far as to form as well as

color were concerned. Fuchs himself communicates the following: In the years 1830–'40 while I was Veterinarian in the veterinary circuit of Schleiden, Malmedy, and Montjoie, I was consulted by a community in regard to an unpleasant occurrence among them. This community preferred the uniformly brown color in cattle to any other color, and yet it happened that the rubican offspring increased in numbers. Upon inquiry I learned that some years previous a rubican bull had been kept in the herd, but as soon as the rubican offspring appeared, he had been removed and supplanted by another entirely brown one. Nevertheless it was observed that uniformly brown cows covered by this bull brought forth rubican calves. Although similar cases may not be known, yet these undeniable experiences of unprejudiced breeders ought to caution against suffering cows of pure races to be covered, even transiently, by bulls of other races, for otherwise the surety of their hereditary transmission will be impaired. We will yet add the remark, that hunters have long since known the infection of bitches, for the designation of which the term "back breeding" is used in the sporting language."

REFRESHING OF BLOOD.

By refreshing or *revival of blood* we understand the bringing together of new pairs of female with new male animals of the same tribe and breed, with which either in-and-in breeding was commenced, or a cross instituted in a staple or breed of cattle not long established by crossing. This is necessary whenever a decrease in the size or the beauty of form is noticed, or a breeding back or a degeneration is observed.

The greater the distance of the districts whence the animals are brought for forming a new staple or breed, and the less the conditions under which they are to live at their new home—feeding, keeping, use and climate do agree with them, (animals brought from moist and fertile districts into dry regions producing less fodder,) the more difficult it will be for them to become acclimated, whereby even their productiveness may be more or less impaired, and the sooner a renewal of blood will become necessary in such case. Likewise the refreshing of blood will be inevitable sooner or later, under such unfavorable circumstances as those just described, to which attention must be paid in the one case as well as in the other; for, otherwise serious disappointment will occur, or the newly created breeds of cattle will be abandoned in the belief that they cannot be preserved while they might have been brought to the former desirable condition by a subsequent renewal of blood and be perpetuated.

But if several renewals can not consolidate a live stock newly introduced or formed by crosses, then these breeds ought not to be kept, but supplanted by others.

Yet in the history of cattle breeding there have been cases where it was deemed advisable for certain reasons to have renewal of blood in tribes formed by crosses which after some length of time had been developed into constant breeds or tribes. But it was not always found advantageous to introduce male breeders of the same races or tribes with which the tribe had originally been formed. Such a tribe produced by in-and-in breeding or crossing is after a long series of years oftentimes somewhat changed by specialities in feeding, by the use to which the animals are devoted, and by climatic influences, so that their further improvement can not be accomplished by the blood originally used for this purpose, but by the introduction of another race, or by a careful selection of the animals breeding in-and in.

DEFINITIONS AND EXPERIENCES IN BREEDING.

Original animals.—All those descending directly from a known race, breed, or family, either born, or at least conceived in their original native country, are called original animals. Instance:-Durham cattle born in their native district, or conceived there and born and reared with us; but by *original descent* is understood the descent from animals conceived and born by original animals without their native country.

Bastards are the descendants from pairings of common with generally acknowledged improved animals; but mongrels are the production by the two animals neither of which belonging to any acknowledged improved race.

Breeding back, in general, are called those descendants in families or breeds formed by crossing, which show the nature and properties of the common ancestors on the mother's side used for forming the new breed.

Breeding back and degeneration are here fully synonymous. But in purely bred breeds or tribes degeneration designates that state of individual descendants bearing the characteristics not of their immediate parents, but of their grand or great grand parents; this degeneration consists mostly in the color, but degenerations in the other sense of the term may also occur. Degeneration generally reaches back no farther than to the fourth or fifth generation. (In man, degeneration after the grand parents is called ativism.)

Blood and *race* are synonymous terms in breeding.

By *constancy* is designated the ability in animals of transmitting surely and fully all the internal and external qualities peculiar to their tribe or breed to their descendants, which ability may have originated from the long continued and constant pairing of animals of the same or of different breeds, even if they were crosses produced through several generations.

The sure hereditary transmission of the character of the race is mostly founded in the established purity of the race, tribe, breed or family; a less reliable constancy, therefore is found in the first and second generation of crosses.

It was and is still of the greatest importance to the breeder to know at what time constancy may be established in animals of new breeds produced by crossing, in order to ascertain when he may commence and continue a system of in-and-in breeding, the animals bred by himself, without apprehending a more general degeneration in the descendants. As to cattle, the general opinion is that, if all the necessary considerations in crossing have received proper attention, constancy will be established in the fourth, fifth, or, at most, sixth generation; but the communications by Scottish breeders, referred to on a previous page, seem to show that constancy is not fully established (consolidated) in the sixth, and not even in the eighth generation.

In order to give in figures a general view of the constancy of the hereditary transmission of qualities, calculations have long ago been made in the following manner:

The prominent qualities of the animal selected to effect improvement are denoted by 100, but the deviating condition of the animal to be improved, by 0. According to the supposition that both parents transmit their peculiarities in equal proportions the result of the first crossing is represented as follows:

I. Generation..................... $\frac{100+0}{2}=\frac{100}{2}=50$ (half-blood).

Then, if the crossing is continued in this way, that the female bastards of each consecutive generations are always paired again with male animals of the same race selected to effect the improvement, the proportions of this progressive improvement are as follows:

II. Generation............. $\frac{100+50}{2}=\frac{150}{2}=75$ ($\frac{3}{4}$ blood).

III. " .... $100+75=\frac{175}{2}=87\frac{1}{2}$ ($\frac{7}{8}$ blood).

IV. " .... $100+87\frac{1}{2}=\frac{187\frac{1}{2}}{2}=93\frac{3}{4}$ ($\frac{15}{16}$ blood).

V. " .... $100+93\frac{3}{4}=\frac{193\frac{3}{4}}{2}=96\frac{7}{8}$ ($\frac{31}{32}$ blood).

VI. " .... $\frac{100+96\frac{7}{8}}{2}=\frac{196\frac{7}{8}}{2}=98\frac{7}{16}$ ($\frac{63}{64}$ blood).

VII. " .... $\frac{100+98\frac{7}{16}}{2}=\frac{198\frac{7}{16}}{2}=99\frac{7}{32}$ ($\frac{127}{128}$ blood).

VIII. " .... $\frac{100+99\frac{7}{32}}{2}=\frac{199\frac{7}{32}}{2}=99\frac{39}{64}$ ($\frac{255}{256}$ blood).

The quotients from 50 to $99\frac{39}{64}$ represent only the *possible* progress of improvement, and the example shows that by further progressive generations there remains always a small fraction by which the cross is inferior to the pure animal. From the circumstances above mentioned which have a favorable or unfavorable influeuence upon the success of the crossing, it is apparent that the success of improvement cannot always be calculated according to this scheme, but it may be obstructed and interrupted in various ways, so that perfect constancy may be established only at a still more remote point of time. Thus, the above calculation is not a fixed rule; but only an approximation.

Generation.—The definition of generation is as follows: All the young of *one* mother together form *one* (the first) generation; if these young again become parents, their offspring represent the second generation, &c., &c.

CATTLE BREEDING AND MANAGEMENT.

BY THOMAS C. JONES, OF DELAWARE, OHIO.

If an accurate estimate could be made of the amount annually lost by the farmers of Ohio on account of breeding inferior animals, and neglect in their management, it is believed that the sum would be so large as to induce instant and general efforts at improvement.

The loss resulting to wool growers from the depredations of dogs, while regarded quite serious by sheep breeders, was not supposed to be of sufficient magnitude to require legislative protection, until by the returns of the assessors the enormous aggregate was presented to the public. The intense indignation of the wool-growers on this subject may be attributed to the fact that, as dogs were regarded as worthless, the immense loss was suffered without cause and without the slightest benefit resulting to any one. But the loss thus sustained is as nothing when compared to the amount thrown away upon badly managed, inferior stock. And the millions of money that are thus annually lost by the farmars of Ohio, are just as causlessly lost as in the case of loss by sheep killing dogs.

The farmer's occupation is subject to vicissitudes resulting in losses which cannot be guarded against; such as injury to growing crops by insects, unfavorable seasons, etc., and the loss of domestic animals by disease or accident; but it is believed that the losses from all these causes, large as they sometimes are, do not in the aggregate compare with those resulting from bad management in breeding domestic animals.

The agriculturists of Ohio, while exhibiting much less skill and care

in the management of all farm stocks than we should expect from their general intelligence and enterprise, are more particularly so in reference to cattle. This neglect, and the consequent inferior quality of this stock, appear the more remarkable when we reflect that it is comparatively so easy to improve it and to maintain its excellence. Animals from well established breeds, nearly perfect in all useful characteristics, can now be had at prices so moderate, that there is no excuse for using inferior "scrubs" for breeding purposes; and to maintain this excellence, nothing is required but the observance of a few well tested rules, *and liberal keeping.*

SELECTION OF BREEDING ANIMALS.

This paper being designed chiefly for those farmers who breed cattle for the common purposes of producing beef or milk; it may be observed that for those purposes the most obvious, as well as the most economical, method to improve our stock, is to begin with procuring a *good bull.* The first requisite here, *is blood;* that is an established uniformity in the family or race to which the animal belongs. It is, of course, important that we have a good animal, but individual excellence will be of little value and we cannot expect that it will be transmitted to the offspring, unless it be established in the family from which he descended.

If a well shaped calf should be bred from ill-shaped and inferior ancestry, we should regard such excellence as entirely accidental, and should not expect its manifestation in the progeny. And it is for this reason that *pedigree is important;* so important indeed that it may be safely asserted that no people in any country, have ever been successful in producing superior stock who have not carefully preserved their pedigrees.

The bull should, therefore be of pure blood, and the only reliable evidence of this, is *the pedigree*, in such perfect form as would be required for insertion in the Herd Books. Good breeders record the pedigrees of their cattle in these books, and when they are found there, it is generally to be inferred that the animal is thoroughbred; the breeders who neglect this safe and convenient method of preserving the genealogy of their herds, may be presumed to be either so negligent in their management as not really to know their pedigrees, or to have impure blood. Next to purity of blood, *compactness of form*, may be regarded as the most valuable point. In size, he should be equal to the full average of the breed, but not too large or overgrown; should be short in the leg, round and deep in the chest, round and broad back, deep flank, hips of moderate length and breadth; the hind legs standing square under the animal, appearing straight when viewed from the rear, but a slight angle appearing at the hock, from a side view, is not objectionable even in the best short horns.

The fore leg should be short and straight, large and powerful above the knee, but small and bony below. The bosom should be broad and full, with a prominent brisket, but the shoulder points should not be protuberant. The neck will be muscular, and with the head and horns will present a masculine appearance—not too coarse and yet not fine and delicate like a heifer. If we have not here some indications of masculine vigor, we may expect the animal, whatever his other merits, to be defective in constitution, and that he will never realize the expectations of the breeder. These characteristics must not, however, be confounded with a heavy, ill-shaped head, sunken eye and large dew-lap, indicating bad temper, bad feeding qualities and bad blood. The head and neck, though stout, should be well proportioned—the eye full and sprightly, the horn, though somewhat thick, should not be too large, nor ill-shaped. The hide must be soft, elastic, and of medium thickness, with hair long, abundant and soft.

Such an animal, with straight back and abdomen ("straight top and bottom," as breeders say), and a round, plump appearance in all points, cannot fail in making the most wonderful improvement upon a herd of good common cows.

The cow should exhibit the same points except the hips, which we expect to be relatively larger, and the shoulders, neck and head, which should be much lighter and finer. Indeed the head and shoulders of the cow can not well be too fine, as this form indicates good milking qualities, superior flesh and good feeding properties. It is, of course, desirable that the cow as well as the bull should be pure bred, but where this is not practicable, common animals as nearly the shape above indicated as possible should be selected. They should be round and plump in form, not long in the leg, with a full eye and pleasant and feminine expression.

A cow with a bad temper, defective form or of bad feeding qualities, *should never be used as a breeder.*

As to the relative size of the male and female, it is insisted by most writers that if one be larger than the other, it must be the female. In breeding horses I am disposed to think that this rule should be observed, that if a large horse is bred to a small mare, the progeny is apt to be ill-shaped and not well proportioned. But from considerable experience and observation, I have become satisfied that breeding large bulls of good proportions to small cows, is not productive of bad results. The offspring, while much larger than the dams, has been as perfect in form as when the parents were of equal size.

I have also bred the large Leicester buck to the comparatively small Southdown ewe, with equally satisfactory results.

In support of this opinion, and also to prove the value of Durham bulls to

cross upon other and smaller breeds, I quote a communication from the British Farmers' Magazine: "A friend of mine had about a dozen North Devon cows, small in size but nice in quality, and from these he commenced about twenty years since, breeding with Shorthorn bulls. He has since invariably used these bulls. With each succeeding cross the stock have rapidly improved in every essential, and the only trace of the Devon which I could perceive when I last saw them, was a peculiar richness in their color. He breeds about thirty annually, and generally sells his three year olds in Autumn at £17 to £22 ($85 to $110) and I have known him to sell in-calf heifers to jobbers in pairs as high as thirty guineas ($150) each. All his stock are superior milkers. Here we have had twenty years experiment and continued improvement." The same writer says: "I have seen many excellent beasts bred from shorthorn bulls and long horn cows; indeed I have never seen one of these bulls bred to any cow where the product was not superior to the dam."

MANAGEMENT.

It is difficult to keep a breeding bull in pasture; they usually become breechy, so that the practice is getting quite common to keep them in the stable, a practice perhaps as economical as any, and certainly the least troublesome. I have known instances of bulls being placed at twelve months old in a lot enclosed with a strong post and rail fence, in which was a shelter for winter, and never taken out, to continue quite to an old age. This is perhaps the best practice. If the bull is kept in the stable, it is desirable that he should have some exercise daily—being led out twice a day a few rods to water will be beneficial. A bull should have very little service until two years of age, and should not be used after old age has begun to influence his condition. He should be in full vigor and health. All breeding animals should be well kept, because *condition* is to some extent inherited by the offspring. The produce of animals habitually in low flesh are not apt to be good feeders.

For the same reason, the calf must have a good supply of nutritious food; for the first three or four months it should have twelve quarts of milk a day. It should also have an abundance of grass, or if this can not be had, when the animal is six weeks old, some meal, bran or oil cake should be fed, and continued until it is weaned, which may be at the age of four or five months. The progress of the calf will be much more satisfactory if the supply of milk is diminished gradually for some weeks before it is finally weaned.

The change from the highly concentrated nutritious food furnished in the milk of the dam, to the more bulky and less nutritious grass or hay, must

not be too suddenly made, nor at too young an age, or it will produce an unnatural distention of the abdomen, causing the young animal to appear ill-shaped and "paunchy;" and this form, with the unthrifty habit thus occasioned, usually continues through life. The bran or meal should be continued through the first winter; the expense will not be much greater than if hay were fed exclusively, while the rapid growth of the animal will give a very large profit on the increased expenditure.

With this management a steer calf will be worth at a year old three times as much as the average of the calves raised according to the system usually practiced. Common calves at this age can usually be had for $5 or $6, and are really worth little if any more than the same animals, well kept, would be worth at four months old; while steers at this age, (12 months) of good blood and kept as here recommended, will readily sell for $18 to $20.

The difference in the value will be nearly three times the difference in the expense. In the one case the amount expended is a clear loss, in the other it yields a large profit. Plenty of good grass through the next summer will bring the yearling in high condition into his winter quarters; and he will be able to maintain this condition tolerably well through the next winter on hay or corn-fodder alone. But a little grain may be very profitable fed towards spring, as it will prepare the animal for a more rapid growth upon the grass of the next summer, at the close of which the steer, if of good blood, will upon this treatment weigh from 1100 to 1300 lbs, and worth in ordinary times from $30 to $40. In January, 1864, my attention was called to a sale of a lot of grade steers 20 months old at $36 each.

Should the breeder conclude to keep his steers another year, they should have the next winter corn in the shock, equal to what is called half feeding, and when there is added to this another summer of good grazing, the animals will be at the most profitable age for sale. They will weigh 1500 to 1700 lbs., and be worth from $60 to $75 each; while common steers of the same age will not exceed 10 to 1200 lbs. in weight, and be worth much less per hundred. A common steer weighing 1200 lbs. live weight, will scarcely make 600 lbs. of beef, while a steer of good blood in ripe condition weighing 1700 lbs. will produce 1000 lbs. of beef. We have therefore this striking difference in the per cent. of dead weight as compared with the gross weight, in addition to the superior quality of the flesh, in favor of the well fed and well bred steer. And it is to be observed that as these merits are becoming better appreciated, the price per hundred of good cattle as compared with common, is constantly increasing.

The heifers should be managed the same as steers for the first two years, and they should be bred so as to come in at the age of three years; and and if designed exclusively for milking purposes it may be as well that

they should come in at two years. I am satisfied that they make better milkers. The calves should be dropped as early as the month of April, as later calves are not so profitable, especially if designed to be raised for steers. Indeed the calf ought to be old enough to eat grass by the 10th of May, so as to give it the benefit of the whole grass season; for it is to be remembered that the chief profit in this business is to be derived from grazing; and our management throughout should be such as to enable us to avail ourselves of all its benefits. We cannot afford to raise cows to sell for dairy purposes. The prices paid, say from $20 to $30, are below the cost of production. A steer at three years old off, will, as we have seen, sell for $60 to $75, while a cow and calf at the same age, and costing nearly as much to produce, would bring less than half the amount. We must, however, raise what are required for our own use, and keeping the best, the very best, all the rest we must convert into beef. It does not pay to sell calves to the butcher. The common price in most parts of Ohio for calves four or five weeks old has been three to four dollars; while the milk consumed, say 12 quarts per day, even at two cents per quart, would amount to seven dollars and twenty cents.

It is bad economy to sell animals at a youger age than two years, as the market price is usually very far below their true value. For example, a fat calf weighing 100 lbs. gross, will make 80 lbs. saleable product—hide and flesh, and ought therefore, as the meat retails as high as beef, to sell for a third more per pound live weight, than a matured animal. But the fact is that they usually sell for much less.

The cost of producing a yearling steer, making a proper allowance for the expense, in part, of keeping the cow and service of the bull, cannot be less than $15; and is probably nearer $20; while the market price for such a steer will not usually exceed $10. But such a steer will, as we have seen, during the next 18 month, with liberal feeding one winter, and good grazing two summers, be made to weigh 1200 lbs., and will sell from $35 to $45; while another year will bring the price from $60 to $75. A lot of several hundred high grade Durhams were sold in Marion county in June, 1863, for $75 each.

It is therefore incontrovertably true that the breeder who sells his steers at so young an age as 12 months is engaged in a losing business, while the breeder who breeds good animals, and keeps them to the age of 30 months and over, is conducting a business that always gives a fair profit. And yet notwithstanding this undeniable fact, it is probably true that more than three fourths of all the steers raised in Ohio are sold by their breeders at or under the age of 12 months, or at all events under the age of 18 months.

Farmers do not figure like merchants; if they did, I am disposed to think that a very large portion of the calves now raised would be knocked in the head and thrown away as soon as dropped. I have said that calves (common ones) are usually sold at $5 or $6 at the age of from 6 to 12 months, and I have shown that this will not pay for the milk they consume, to say nothing of the other feed.

To illustrate the advantage of good blood, and the profitable results of high feeding, a statement is here appended taken from the Country Gentleman, of the cost and return of a fat ox:

Age.	Cost to date.		Live weight.	
6 days	$4		84	pounds.
6 months	10	Milk and grass.	555	"
1 year	29	Hay, potatoes, and provender.	820	"
1½ years	39	Grass.	1070	"
2 years	59	Hay and two quarts provender.	1360	"
2½ years	72	Pasture only.	1550	"
3 years	94	Hay and three quarts provender.	1735	"
3½ years	108	Pasture only.	2005	"
4 years	136	Four quarts meal and hay.	2215	"
4½ years	166	Meal and hay.	2365	"
5 years	198	Five quarts meal and hay.	2570	"
5½ years	233	Six quarts meal and hay.	2710	"
6 years	274	Eight quarts meal and hay.	2815	"
6 years and 10 months	339	Twelve quarts meal and hay.	2840	"

He was slaughtered at this last mentioned age, and the weight, 2840, was after a fast from food and water of 40 hours, and was sold for $325, nearly 11½ cents live weight. His dressed weight was—beef, 2209 lbs.; tallow, 190 lbs.; hide, 130 lbs; total 2529! He was a grade short horn, light of offal, small boned, and sprightly. He was fed too long for profit; at the age of three to four years he could have been sold at a fair profit upon the entire cost, while the result in the end is seen to have been a small loss.

This illustrates the superiority of those breeds which "carry their growth with their condition," and excel in early maturity.

This statement proves also the important fact already referred to, that in producing beef, the profits are mainly derived from grazing. Undoubtedly this steer was stabled in the winter, and was fed on ground feed, and probably roots, so as to produce the most rapid and economical increase in weight; and yet it will be observed that the increase on grass, in proportion to the expense, is much the best. And this suggests the propriety of observations in this paper on

PASTURES.

Of course the limits prescribed for this article will permit only a few suggestions of a practical character.

It seems that in this State, so far as our experience goes, we are limited to a very few varieties of grasses for permanent pastures. I place at the head of these, blue grass, (*poa pratense*) then orchard grass, and for rich wet soils, red-top; which latter is a much better grass than is generally supposed by farmers. These three varieties have the merit of "staying;" and they are, so far as I know, the only good varieties yet tried in Ohio, that will not run out.

In selecting the grass for pasture, as well as its management, of course very much depends upon the character of the soil. The blue grass will, and does grow in all parts of Ohio that I am acquainted with, though it does best usually upon the limestone soils; having a surface root, it is not adapted to light soils, and suffers great injury on any soil from hot, dry weather, if pastured close. In this respect the orchard grass is superior to it, the roots going much deeper. Indeed this grass stands dry weather as well as clover.

The orchard grass does not cover the ground as well as the blue grass, though when it is pastured it is much better in this particular than in meadow. The best pastures are produced by sowing both these grasses together. It is also recommended that red clover should be added, and perhaps timothy; not that either of these latter will remain in the pasture, but I have observed that the effect of the clover roots in loosening and enriching the soil, adds greatly to the growth af the blue grass. And the timothy will afford some pasture for a few years, and until the blue grass spreads so as to occupy the ground.

There has of late been considerable discussion as to the merits of permanent pastures as compared with those that are frequently cultivated. The differences of opinion upon this subject probably arise from observations upon different soils. Undoubtedly a rich soil, well adapted to the production of grass, like some of the black lands in the counties of Marion, Union, or Madison, or the bottom lands on any of our streams, will produce better grass, and in all respects more profitable returns as pasture lands, where they are never plowed; aud upon such soils the practice cannot be too highly recommended.

But upon heavy clay lands there can be no doubt but that an occasional breaking up, so as to expose the stiff sub-soil to the action of the sun and the frost, is absolutely necessary. I appreciate the force of the argument that these soils from the leaves and other vegetable matter that have been deposited for hundreds of years, have in their natural state a richer surface than we can ever give them after we have broken them up. All this is very true; but it is also true "that a soil that is not penetrated by air can never, however rich in the food of plants, produce a good crop."

With deep cultivation, the application of manure and clover, most of our clay lands may be brought into condition, if drained, for permanent pastures. And upon these soils, for the reason that our object must be in all our proceedings, to loosen the soil so as to admit the air, whenever we sow to grass, whether it be for meadow or pasture, we must add clover to our mixture of seeds.

It is surprising how much farmers lose by thin sowing. It is a common practice to sow but a bushel of timothy to eight acres; which is certainly not more than half the quantity that should be applied. Suppose this seed to cost three dollars, or if a proper mixture of seed, say five dollars; by adding as much more, we make the cost of the seed but one dollar and seventy-five cents per acre; which would be far less than the difference in value in a single year, between a thick crop of grass, covering well the ground, and such thin crops as we generally see. But should the seed, by procuring the best varieties and a suitable quantity, cost twice this amount, the sum, when a permanent pasture is to be established, would be a matter of no consequence in comparison of the benefits to be derived from proper seeding.

If from any cause the grass comes up thin, or we have bare spots, we must apply the harrow and more seed immediately, for it will never pay to wait until the grass spreads, for we shall thus lose many times the expense of the application of more seed, lose indeed more than it would be worth to plow up and sow over again.

I doubt the policy of top dressing old pastures, as practiced with us. On rich soils it is not necessary, on stiff clays, for the reasons already stated, if the pastures fail, they should be broken up; and the application of manure on the surface then, with the seed, will be productive of the best results. On light sandy soils the application on the surface is a good practice.

The advantage of keeping our pastures always up to a "full bite" for the cattle, cannot be overestimated. Without this the stock cannot be kept at the highest point of improvement, as they always should be to give the most profitable results. But a consideration equally important is the fact that a given quantity of land will produce far more pasture when the grass is thus up, so as to protect the ground from the heat of our dry summers.

THOROUGHBRED CATTLE.

The State of Ohio has about 2,000,000 of cattle, of which about 800,000 are annually disposed of as fat cattle. If these latter were all pure bred or high grades, it is obvious that their aggregate value would be very largely increased; probably $10 per head would be a low estimate of the

value of such improvement, which would give an aggregate annual value to the wealth of the State of THREE MILLIONS OF DOLLARS.

And yet notwithstanding the fact that cattle breeders could so easily add this immense amount to their annual profits, it is probable that efforts to accomplish this improvement are not as efficient now as they were a few years ago. We have fewer thoroughbred cattle now than we had in 1860.

A few spirited breeders in the Scioto and Miami valleys have, at different periods made large importations of the best cattle that could be procured. The liberality of these gentlemen furnished us ample means for the improvement of our stock throughout the State.

But for want of sufficient encouragement to make the breeding of these magnificent animals profitable, it has been to a great extent abandoned, so that the number of large herds of thorough bred cattle are very limited. It was not to be expected, nor did these importers anticipate, that all the farmers of the State would become breeders of thorough bred stock; but looking to the fact that short horn bulls could be profitably bred at about one hundred dollars each, and that if bred to 50 common cows at the price of only $3 00 each, the price and expense of keeping would be made in two years, that all thrifty men who kept bulls at all would as a matter of self interest, procure thorough bred animals. As has been already shown, this price for the service of a bull would be returned three fold in the increased value of the progeny, even for breeding steers for beef.

The influence of these importations in improving our stock has been very great, and if cattle breeders generally were to avail themselves, of the opportunity now within the reach of all, of using thoroughbred bulls, the improvement would soon become universal, and the breeders of this stock would be encouraged to maintain the excellence of their herds.

But without such encouragement there is reason to fear that in the course of a few years our thoroughbred herds will be all broken up. Should this take place it will not be long before all the benefits derived by the infusion of this blood into our common stock will entirely disappear. "Blood will tell," it is true, but only so long as we have pure bred animals to resort to; the blood in the grades will soon "run out," if they are bred together and to common stock. It is much cheaper for a person engaged in the ordinary business of farming to purchase a bull, say at $100, than to breed him. To breed this stock and maintain its excellence, requires a peculiar taste and skill, very close attention and considerable capital. It should be a business by itself; and to succeed well at it, a man must, to a great extent, make it a speciality. The superiority of English stock has been established, and is now maintained by this practice

We find breeders there who have been all their lives devoted to this business; and from these the farmers have purchased and hired breeding bulls, until a large majority of the good cattle of the kingdom have a strong infusion of short horn blood.

What are the small number who still continue the business of breeding thoroughbred stock in Ohio to do? I know they have been seriously considering the propriety of abandoning it entirely. In proportion to the amount of capital invested their profits have been much less than has been realized by those who have purchased pure bred bulls and bred them to good common and grade cows. Still I think a man who has thoroughbred stock, who breeds only for the common purposes of producing beef and milk, can make it *pay* to keep them. I do not say that the breed can be kept up to its maximum excellence without a larger expenditure than would be justified if sales were only made for these common purposes. For in order to keep up such a herd it will be necessary frequently to purchase the best bulls that can be had, and these, though there is very little general demand, are not obtainable at less than from $500 to $1,000. In a herd of this sort no cow should be retained that is not good in all useful points; and as the superiority of the short horns over all other breeds, consists in the combination of the two great requisites of excellence for beef and milk, no cow should be used that is an inferior milker.

Many of the calves, therefore, must be consigned to the butcher, and the best only retained as breeders. These until they arrive at maturity must be so liberally fed as to continue all the time in rapid growth, for this thrifty *habit* will, as we have seen, be inherited by the progeny. They should not be kept too fat, and especially should breeders be careful to guard against this in adult bulls. This condition is injurious to their health and vigor, and will be likely injuriously to affect their offspring.

Breeding ought not to be commenced until the animals, male and female, are nearly full grown, and should not be continued after age has began to effect their condition and to reduce their flesh. In-and-in breeding should be avoided.

It is better to breed to a good animal that is closely related than to breed to an inferior one that is not. But the practice cannot be long continued without producing the most injurious consequences.

A few eminent breeders in England adopted the practice, not however, as some modern writers now insist, that it was the better practice, but under the pretence that they could not get animals out of their own herds of equal excellence. The modern theory on this subject is opposed to common sense and contradicted by experience. It is not true that the practice produces uniformity which is the main argument urged in favor of its

adoption. Many of the animals of C. Colling and Bakewell were striking illustrations of the truth of this statement, and their entire herds were less uniform than those of other good breeders who avoided the system. Whether the progeny of two animals that are bred together will inherit their characteristics will depend upon whether these characteristics have been for a long time exhibited with uniformity in the ancestors of each, and not at all upon their being related to each other. If the two be alike and of the same breed, and their ancestors have been of uniform characteristics, their produce will be *more likely* to be so, than if the parents were closely related.

Indeed long continued in-breeding will not only injuriously affect the constitution and tend to produce barrenness, but will frequently produce *monsters*, animals wholly unlike their parents, and exhibiting characteristics totally different from the breed to which they belong. I mention in illustration, the well known Longhorn bull *Shakespeare*. Mr. Bakewell's bull D. was got by a son of *Twopenny*, out of a daughter and sister of the same bull, she being the produce of his own dam. Shakespeare was got by D. out of a daughter of Twopenny. What were the characteristics of this animal thus closely in-bred? Mr. Marshall gives the following description:

"Though bred in the manner that has been mentioned, he scarcely inherits a single point of the longhorned breed, his horns excepted; his head, chop and neck remarkably fine; his chest extraordinarily deep; his brisket down to his knees; his chine thin, and rising above the shoulder points, leaving a hollow on each side behind them; his loin of course narrow at the chine, but remarkably broad at the hips, which protuberate in a singular manner; his quarters long in reality, but in appearance short, occasioned by a singular formation of the rumps. At first sight it appears as if the tail, which stands *forward*, had been severed from the vertebræ by the chop of a cleaver, one of the vertebræ extracted and the tail forced up to make good the joint; an appearance, which, on examining is found to be occasioned by some remarkable wreathes of fat formed around the setting on of the tail. * * * His horns apart, he had every point of a Holderness or Teeswater bull. Could his horns have been changed he would have passed in Yorkshire as an ordinary bull of either of those breeds. His two ends would have been thought tolerably good, but his middle very deficient," &c.

Many other instances might be given showing similar but not such remarkable results from this system of breeding. This system at first seems to increase the fattening qualities and to reduce the size of the bones—the produce appears in all respects finer and rather smaller; but after several

generations of this practice is continued the produce seems irregular, some still fine and some very coarse, and very frequently I have noticed a sullen, ugly disposition and impaired animal instinct. Another defect quite common is a defective chest, the natural result of an impaired constitution.

This paper being designed merely to contain a few general suggestions to practical men, it is not within its purpose to describe in detail the form we should endeavor to preserve in breeding these animals; the various works that have been written and are presumed to be in the hands of all good breeders contain all that is to be desired upon this head. It is likely that the best specimens of the Durham breed of cattle as we now have them, are as near perfection as could be desired.

It is, however, respectfully suggested, that the prevailing fashion upon some points in reference to their characteristics is not entirely correct. For instance undue importance is attached to hips of great length and breadth. As remarked by that high authority, Youatt, "a full hip may be an advantage, but surely a protuberant one." I like a wide and long hip, but have seldom seen animals exceeding the average in these particulars, that were not defective in the middle. There is no point more important than a *good rib;* by which I mean not only that the chest and barrel shall have the proper shape, but the animal shall lay flesh *on the rib*, a quality rarely found in animals with hips of extraordinary width.

As to the horns, the fashion requires them to be light, *very* light, without which the best animal is seldom placed first on the prize list; and yet certainly this is a point of no *useful* importance at all. Many judges also insist upon a delicate, heifer-like appearance in a *bull*. I respectfully suggest that animals thus fashioned are seldom good breeders. We must have some indication of masculine vigor about the head and neck of a bull, or we cannot expect a good sound constitution.

It is the prevailing practice, too, other things being equal, and frequently when they are not equal, to place the *largest* animal first. I do not object to size if we have compactness, but this is indispensible, and it will be found that it seldom or never is found in an animal that is much larger than the average size of his breed.

It is believed that breeders generally do not attach sufficient importance to QUALITY. By which I mean, first and most important of all, that the animal shall be a good feeder. This indispensable excellence is generally indicated by a plump, round "middle piece;" broad chine and loin; low flank; full twist; light head, with sprightly, intelligent countenance, and bones small and fine at the extremities; and particularly, by good handling. That is, a skin soft, yielding and elastic, with long, soft and abundant hair.

But we must not be satisfied with the propensity to "lay on flesh," important as it is. We must have it distributed evenly all over the valuable parts. Without this "point" made good, no animal, whatever may be its other merits, should ever be placed on the prize list. When the flesh is irregularly laid on; when the animal is, as we say, "patchy," the beef is not well "marbled," the lean portions being dark in color, tough and inferior in quality, and the fat distributed in lumps, so as to be worthless for the butcher.

In some quarters the practice prevails of breeding cattle in distinct families, beginning with some cow of distinguished reputation whose name designates the tribe. So far as my observation extends, this system has not been productive of any very successful results. At this day the individuals of these fashionable families have very little of the blood of the animals from which they derive their names, certainly not enough to claim much excellence on that account. In most instances the pedigrees will show that not more than one-sixteenth of the blood of the original favorite remains; though in later generations, we have generally very close in-and-in breeding, as if it were designed to induce the belief that there has been a strong concentration of the superior blood. This practice, instead of producing uniformity, produces diversity, some animals exhibiting a very high degree of excellence and many others being exceedingly indifferent; far inferior, indeed, to the average of the breed; exhibiting defective chests and crosses, bad constitutions and ill-temper.

The practice is calculated, if not designed, to deceive the public, by inducing the belief that these families have some superior excellence not possessed by other thoroughbred animals, which excellence will be transmitted with as much certainty as the peculiarities of a distinct breed.

It is admitted that it is not enough that our breeding animals are thoroughbred. The importance of selecting for this purpose the best individuals of the race, has been already urged. But this advantage is not secured by confining ourselves to particular families, or the practice of keeping up distinct families. That pedigree is the best in which are found the largest number of good animals, each being judged by its own merits, and not by the fact that some remote ancestor was distinguished for excellence.

The breeding herd should also be composed of animals which are not only good in themselves, but possessing in addition the merit of being good *breeders*. Bulls should be used which have been tested and proved to be good getters; for every intelligent breeder knows how often we find first class "show bulls" that turn out inferior breeders. The practice of breeding untried bulls, though good in every point, in a large and valuable

herd of thoroughbred cows, is frequently productive of very serious loss. For the same reason, a bull that has proved himself a superior breeder, should be carefully managed and preserved for service as long as he retains his vigor, which they frequently do to the age of eight or ten years, and even older. A bull of this description is worth more to the owner of a large herd of thoroughbred cows than any untried bull, however superior in individual excellence.

In England, aged bulls, of good reputation as breeders, are frequently let for service for a single year for more money than good untried bulls are sold for. With us the practice is altogether different, it being exceedingly difficult to sell an aged animal however excellent his progeny; and to this fact may probably be attributed the apparent difficulty of maintaining the excellence of our cattle.

Reference has been made to the number and value of cattle annually bred in Ohio; the immense amount lost on account of breeding inferior animals, and improper management, and the great importance of improvement. Some of the discouraging indications as to the future excellence of our stock, have also been mentioned. We have, however, a sufficient number of thoroughbred cattle of the highest merit, to make our stock in a few years superior to that of any State in the Union.

And surely our farmers have wealth enough and enterprize enough to justify the hope, that this improvement, so obviously profitable to them, will be rapidly carried forward. But this expectation will not be realized, unless those breeders who have large means will engage heartily in the work. They must, by establishing herds of superior excellence, present examples for the imitation of their neighbors. Ohio has the right to expect that the owners of her large and fertile farms will not neglect the opportunity here presented of adding to the wealth and reputation of the State; that this class of her citizens have intelligence enough to look beyond the immediate profits to be derived from their operations, to the more important future results to flow from the possession of superior thoroughbred stock, the highest evidence in any country of the prosperity and superiority of its agriculture.

The domestic animals of England are superior to those of any other country in the world, and this excellence has been attained by aid of the liberal encouragement of her noblemen, who hold the large landed estates. Shall it be said that this titled class, who hold their property by an accident, have more intelligence and public spirit than the rich landholders of Ohio, whose property has been acquired, for the most part, by their own enterprize and intelligent industry?

PRECOCITY OF DEVELOPMENT CONSIDERED IN RELATION TO THE RESULTS OF THE PRESENT SYSTEM OF BREEDING AND FEEDING.

BY PROFESSOR BROWN, V. S.

From the Journal of the Bath and West of England Society.

In dealing with any subject of importance it is desirable to avoid confusion at the outset, by affixing a precise meaning to the terms employed. This is especially the case with reference to "Precocity of Development," since it is quite possible that what one man may consider to be rapid another may regard as comparatively speaking tardy. What we really mean by the term "Precocity of Development" is the premature occurrence of the ordinary signs of maturity, in size, appearance, and general qualities. But how are we to decide whether an animal's arrival at maturity is premature or not? By ascertaining the time required for perfect development in a wild state, before definite attention was paid to the means of accelerating growth.

The originals of our several breeds cannot be found, nor has their history been very minutely traced for us; but enough has been recorded by careful observers to prove that a change has taken place in the capabilities and characteristics of most breeds of animals coming under the denomination of Stock. So generally admitted is this view that its denial would be taken as an imputation upon the breeders of the present time. Universal assent will, therefore, probably be accorded to the proposition that varieties of animals, distinguished as cultivated or improved breeds, arrive at maturity earlier than their originals did when existing under less artificial conditions. Starting from this point it is required to determine *what effects follow this production of premature maturity, whether beneficial or otherwise.*

As bearing upon this question, we may adduce the maxim, that whatever is rapidly produced is by consequence wanting in stability. In support of this idea instances without number might be drawn from mechanics and from natural history. It seems, indeed, to be a settled point, that every work in nature or in art, to be properly elaborated, requires a certain amount of time to be devoted to its construction; whilst an attempt to accelerate its completion always results in some radical omission or defect; so that under all circumstances it would be accepted as a legitimate apology for faulty performance, that sufficient time had not been allowed for the proper arrangement of the necessary parts. In the vegetable kingdom it is proverbial that plants of slow growth are the most durable,

whilst that produced in a single night may wither in the next day's sun. In animals, not only are the tissues subject to the operations of this rule, but even the intellect, which precociously matured is rarely lasting, seeming by its very vigor to exhaust itself. Thus we are told that the prodigy of six years is often the imbecile of twenty. The explanation of these phenomena is scarcely possible; no more so, indeed, than is that of the primary properties of matter, whether hardness, transparency, affinity, or polarity.

It must be accepted as a general rule that certain combinations, possessing durability, can only be effected under proper conditions, time being one of the essentials. Thus, in the absence of the proper amount of time; or of any other essential circumstance, the results although apparently perfect, lack the power to resist, the various destructive influences to which they are exposed, and hence the combination soon ceases to exist. So far the argument is in support of the general idea; but on the other side of the subject there is something to be urged. In the first place, it is alleged with truth that there is no direct proportion between the time occupied in the development of the fœtus and the average duration of the animal's life after birth. Thus man, whose fœtal life continues for nine months, has a longer average existence than the horse, whose fœtal life extends to eleven months; and further, in reference to other animals, including birds and fishes, discrepancies are constant. Next, it may be remarked that the time required for effecting permanent combinations is not definitively fixed, and therefore it becomes difficult, if not impossible, to determine what is premature development and what is not. The first objection is unanswerable, and so far affects the general proposition, as it proves it to be open to exception. The second objection is readily disposed of by remarking that experience will determine the requisite time under all circumstances. Thus the period required for the proper development of the fœtal structures is fixed in each case, and has not, so far as we know, been influenced by change of circumstances, nor in any great degree been subject to variation.

If we could accelerate the process of fœtal growth, it would then be easy to decide the general question, how far such change would affect the subsequent duration of the animal's life; but in the absence of such power we are compelled to leave the problem unsolved, and proceed to the particular proposition which more immediately concerns us, viz., *the influence of external circumstances in relation to the growth and development of the animal tissues after birth.*

Here, again, the question of time returns in reference to the attainment to maturity, and again the answer must be given in accordance with ex-

perience. Arrival at the adult period is determined by certain indications sufficiently definite to be universally recognized, and to remove all difficulty about the time of its occurrence, the animal is fully grown, the permanent dentition is complete, and all the physical qualities are perfect. At this period the assimilative functions seem to lose some of their activity; and the deposition of new materials under perfectly healthy conditions is about equal to the waste of the tissues, preserving something like uniformity of size for a time: as age advances nutrition becomes still less active, and often less material is deposited than suffices to supply the waste, and a decrease in bulk is the result. This, however, being influenced by various circumstances, is not an invariable consequence.

Natural development presupposes a healthy condition of system, sufficient food, and the full exercise of every organ: such conditions, in fact, as ordinarily exist in nature. In association with these favorable circumstances there will be others of an opposite tendency, whose operation, however paradoxical it may appear, is conducive to the desired result. In the discussion of these opposing influences we shall find much that is of practical value.

DEVELOPMENT OF THE ANIMAL UNDER NATURAL CONDITIONS.

In the wild state, where domestication has no influence, and man's interference is not felt, the conditions of existence are very materially different from those which are artificially established. Weak and diseased animals are placed in the most unfavorable position. Where healthy animals owe their preservation to their capabilities of flight, the maimed have slight chance to escape destruction; and, in general terms, where full vigor of all the animal faculties is indispensable to the preservation of existence there is present a natural and constantly-operating agency for the destruction of defective animals, who, under other conditions, might exist and perpetuate their defects.

On this grand principle depend all the essential differences between the natural and artificial conditions of life. In nature there is a guarantee in some considerable degree for healthy development; while under domestication much is left to be determined by judgment or caprice. Naturally, therefore, we may conclude that a healthy state of the organism will, as a rule, characterise the majority of animals under natural circumstances.

As the conditions of existence influence the animal's qualifications and tendencies, we may still further conclude with safety that there will be a proper exercise of all those capacities, which become more developed as they are more actively employed. In this way the strongest and most perfect animals enjoy the largest share of the advantages of their position,

while the weakly ones are most affected by destructive agencies, such as inclemency of season, scarcity of food, and predatory attacks from larger animals.

It is not contended that an entire exemption from injury or disease is a condition of the natural state of existence. Animals suffer from accidents of various kinds, and are commonly found affected with disease; but it is most important to observe that any radical defects are not likely to be perpetuated, because the circumstances under which the animal is placed lead to his destruction so soon as he ceases to possess the qualifications necessary for resisting the adverse influences by which he is surrounded. It is scarcely necessary to illustrate this statement, although numberless instances at once present themselves. An animal whose freedom of movement is interfered with becomes an easy prey to his pursuer, while the predatory beasts under like circumstances are incapable of providing food for hemselves.

Radical defects, it is apparent, can only be extended to a certain point, and that not a very remote one; for the reason that their general extension would diminish, and ultimately exterminate the race, by depriving it of the qualities on which its existence depends.

Every animal in a state of nature has to seek its own food, and in so doing preserves the due proportion between the waste and reparation of his tissues. The food on which he subsists, again, contains in natural combination the elements which he requires, and which his organs are capable of appropriating. Certain portions are devoted to the support of his flesh, while other parts furnish the necessary supply of fat; any excessive accumulation of one or the other being prevented by the healthy activity of the excretory organs. By exertion, by respiration, by exhalation from the skin, by secretions from the liver and kidneys, the old and worn-out materials are removed, and by digestion of the elements taken by the animal as food new materials are prepared, and in the course of the circulation of the blood deposited to compensate for the waste. So long as all these conditions continue in perfection, so long as the old materials are removed and the functions are all active, and the animal obtains a due supply of proper food, it is difficult to realize the possibility of the occurrence of disease, except from the action of some violent mechanical or chemical cause.

During the growth of the tissues many circumstances influence the development of particular parts. In animals whose mode of existence necessitates speed, for pursuit or flight, the respiratory organs, with the organs of progression, will indicate the possession of the capability; the habit of rapid movement naturally leading to a preponderance of those parts which

are most necessary for the perfection of the quality; under the same circumstances the circulation will be very active, and hence the organs in this system will be proportionately developed. Activity of respiration, circulation, motion, and secretion, are opposed to excessive accumulation of tissue, particularly of fatty tissue, as well as to great bulk of body. It is merely begging the whole question to say that these things are denied the animal because they would encumber his movements; they are absent because the habits of his life occasion the development of organs whose healthy exercise is opposed to such accumulations; quick movement, active respiration and excretion being destructive actions, are of necessity incompatible with excessive deposition.

Domestication essentially modifies the conditions of existence, the change being in exact proportion to the difference of the animal's previous habits, as compared with his present mode of life. How decided the variation really is will be apparent upon a very cursory review of the new circumstances under which he is placed.

DEVELOPMENT OF THE ANIMAL UNDER ARTIFICIAL CONDITIONS IN A STATE OF DOMESTICATION.

Instinct, which guides the wild animal in the choice and pursuit of his food, and volition, which regulates his movements, are alike rendered powerless by the new conditions of his existence. It is no longer for him to determine when he will seek provender, or what kind of aliment he will select. A superior will is substituted for his own, and he has now no choice but to eat and drink, more or less, according to his possessor's judgment.

Seldom, in thinking upon the differences between the wild state and domestication, do we quite realize the change in its completeness; how entirely in nearly every particular the circumstances are altered. The animal's character may remain the same, but his power of action, his individuality, is lost; if he has been accustomed to depend for his food upon his bodily strength and activity, he is now to remain quiescent until supplied with what is deemed necessary for his sustenence; if formerly he was in a state of ceaseless motion, he must now rest until permitted to move. Scarcely one of his qualities can now be spontaneously displayed.

Of the positive influence of the artificial system of treatment no more satisfactory evidence can be adduced than is afforded by the changes observed in the development of the teeth of the domesticated breeds as compared with the production of those organs in animals placed under more natural conditions.

M. Gerard, in his work upon the teeth, places the completion of permanent dentition in the ox at four-and-a-half to five years; that of the sheep from four to four-and-a-half years; of pigs, two and two-and-a-half years. That his statements are founded upon observation no one will doubt who considers his professional position. As early as 1846 the occurrence of a remarkable case on the Continent excited considerable attention. In 'The Veterinarian' for 1847, M. Renault comments upon this case in a letter dated August, 1846. After remarking on the importance of admitting the influence of early feeding and careful selection of breed upon the dentition, he adduces the instance of a certain bull (Antinous) who, at an adjudication, extorted universal admiration on account of his fine quality, but was refused the prize on the ground that the conditions specified that the candidate should be but *two years* of age, whereas the animal, from the condition of his teeth, was four years old and upwards, and the opinion was corroborated by several veterinarians, who all certified the bull to possess all his permanent teeth. Ultimately satisfactory evidence was given that the animal was really no more than two years old. M. Renault commenced a series of inquiries upon the point in question, stating his conclusions as follows:—

"Uniformly where the ox species has experienced the ordinary kind of management and feeding, wherever food, however good, has been given as ordinary nutriment, and not for forcing or fattening; in all such parts of the country dentition follows the ordinary course, as indicated by writers on the subject.

"But these rules, the result of long and accurate observation, and correct and well founded at the time when and in the countries where they were made, are no longer applicable and true in regard to certain individuals and certain breeds.

"Indeed, thanks to a better system of management and feeding of cattle, and to judicious and advantageous crossings, it is certain that for some years past many of our bovine races have experienced in their form, and especially in their precocity of development, unmistakable amelioration.

"Whatever may be the cause of this remarkable aptitude in certain breeds to acquire their growth early, it is readily conceivable that such precocious development can not be confined to any particular organs. If every one has not equally participated in it, at least they are all more or less affected by it. Above all, the digestive system—the part called in to play an important part in the preparation of such aptitude, since all must essentially result from the nature and action of alimentation—must be one of the first to undergo important modifications.

"Physiologically, therefore, it may be argued, we must admit that the

use of teeth and dentition ought to be earlier in subjects weaned at so early an age, and so soon fed with substantial food."

Nearly twenty years have passed since these observations were made, and animals have continued to progress in their aptitude to fatten, and their precocity of development, as witness some of our best horses and oxen at two years old, sheep at one year, and pigs at six months.

DOMESTICATION NOT ONLY MODIFIES THE CONDITIONS OF DEVELOPMENT, BUT IT EFFECTS IMPORTANT ALTERATIONS IN CIRCUMSTANCES UNDER WHICH DISEASE IS PRODUCED AND EXTENDED FROM ONE GENERATION TO ANOTHER.

Disease in the wild animal finds its limitation in the general probability of the subject falling a victim to the numerous adverse influences, which he is incapable of combating. In domestication these adverse influences lose much of their power, or are sensibly modified by the institution of measures intended to combat their effects. Defects, which in a natural state would render the animal incapable of living, and which, if perpetuated, would ultimately lead to the extinction of the race, are, under the new conditions, fostered and extended, and take the name of "hereditary" or "transmitted" diseases, running through whole generations, or occasionally ceasing for a time only to burst out again with renewed violence.

It would be doubtless a reproach to our humanity if the weaker animals did not receive more care and consideration than the stronger; but who fails to comprehend that this course of procedure, the opposite of what is true in nature, must ultimately be injurious to the race, however conscientious we may be in adopting it? Singularly enough the details of the natural system which often are harsh, even relentlessly cruel, in our estimation, tend to the universal progress; while our efforts, dictated by humane consideration and undeniably productive of immediate individual or limited good, have often the tendency to produce universal deterioration.

Wild animals will not be expected to improve under the treatment they meet with in domestication at the commencement; not until they have become perfectly habituated to the new mode of existence are they likely to accommodate themselves to the change. The time required to effect this will vary, but several generations must pass before the wild original progressively passes into the domesticated animal, who now possesses so few of his native qualities as to be incapable of existing under conditions which were formerly essential to the continuance of his race.

During the transition from the wild state, and when the new variety, "the domestic animal," is established, numerous circumstances may be brought to bear with important influence upon the development. Reverting to what has been stated under "development in the natural state," we find the modifying circumstances to be, selection, the strong having the advantage; destructive influences tending to remove the weak and diseased; food possessing the elements of nutrition and respiration in due proportion; and legitimate exercise of all the organs of the body. All these are in greater or less degree under our control when animals become subject to our influence.

Selection we can arbitrarily arrange according to our ideas of fitness or our object in the production of new characters; the various destructive influences we can ameliorate, if not remove; the elements of food we can apportion with almost chemical exactness, whether we desire an excess of fat or flesh producing materials; and most of the organs of the body are directly or indirectly under some degree of control.

Experience and observation having demonstrated the possession of a power to influence the animal's qualities and physical conformation, it becomes immediately a matter of inquiry, how far it is possible to proceed. Experiments dictated by fancy or founded upon calculation are made, with variable results; new facts are discovered, and a gradual progress is made towards the foundation of a system. According to the object desired will the aggregate result be apparent; one aims at producing bulk and physical strength, another speed and lightness; a third sees a special gain in color, or some particular line in conformation.

It would far exceed our limits were we to attempt an extensive examination of the subject; nor would any advantage accrue, as the animals with which we are more immediately concerned afford sufficient evidence for the support of our argument: we have only to point to the existing breeds to prove what changes may be effected by attention to the circumstances which influence development. It is not advisable to indulge in speculation, but we presume it can hardly be questioned that there was a time when Devons, Herefords, Short-horns, and Long-horns, did not exist as we know them now; nor can it be doubted that the varieties, compared with their originals, could such be found, would present modifications so marked as to lead to reasonable doubts of their having descended from a race so apparently distinct.

Advancing rapidly to the practical section of the subject, it may be advantageous to indicate the position we have been endeavoring to establish.

At the commencement we explained the meaning attached to the term "Early Maturity," and referred to general observation and experience to

prove that in cultivated breeds maturity is attained more rapidly than under natural conditions. In considering, in the next place, the universal idea that what is rapidly produced is wanting in durability, we found it necessary to accept the fact as established by general observation, and explained, on the principle, that permanent combinations can only be effected under proper conditions, time being one of the essentials. The differences between the circumstances of the natural and domestic states were next discussed, as affecting the development of the tissues, the general conclusion being deduced that important modification of form and quality may be effected by regulating the condition of the animal's existence, according to the object we have in view.

It being conceded that there is a possibility of controlling the animal's development, and producing such alterations of physical form and qualification within certain limits as may be determined upon, it is very important that the power should be exercised with circumspection. How far this is the case will appear as we proceed.

Whatever minor objects may be kept in view in cultivating certain kinds of animals, there is ample evidence to prove that the paramount one is to lose as little time as possible in fitting the animal for his intended purpose. Without any qualification that statement must be made; in obedience to the spirit of the age, every thing must move rapidly to its destination, and animals, as well as machines, must be brought to the greatest perfection in the shortest space of time; failing which, in either case, no superiority in other respects can save from condemnation.

Imagine a breed of sheep, furnishing mutton of a quality hitherto unknown, rich in nutriment and of rare flavour, but insipid and unwholesome, until the animal had reached the age of 4 or 5 years; not the possession of all the qualities is excess that make the best varieties valuable, could render such a breed popular, save with the wealthy epicure. Extend the same reasoning to horses; establish a breed possessing every requisite, opposed by the single objection that the animal must be 6 years old before he could be used, and the extinction of the race would be certain. Further illustration can not be necessary to prove what hardly any one can doubt, that the tendency of the whole system of the present day is to force animals by every available means to a premature adultism; and to call into active exercise the powers which are yet imperfect, for the reason that one important condition, TIME, is wanting. Upon different animals this forcing system will produce results varying, in some degree, according to the characteristics of each; there are, however, certain inevitable consequences which affect all in a nearly equal degree. These may be termed the general results, while the others having reference to each breed may be distinguished as the particular results.

GENERAL RESULTS OF THE FORCING SYSTEM.

Early maturity, if legitimately attained, is doubtless a desideratum; but in the anxiety to exceed the ordinary rate of development, too little regard is paid to the possible production of disease. Animals are highly fed, kept in a warm temperature, denied a proper amount of exercise, and yet no ill results are anticipated; and, in the event of active disturbance supervening, there is immediately a wondering inquiry as to the cause, as if every circumstance in the animal's treatment did not deserve the title.

Taking the whole system of management, we find all the conditions tending to the same results: the food, the stationary position, and the warm temperature, all unite to diminish expenditure and facilitate excessive deposition. Of these three, the food supplied exerts the most decided influence, by furnishing an abundant material for the support of the body. Fatty tissue becomes abundant enough in a comparatively short time; but the muscular structure does not experience any improvement, on the contrary it deteriorates. This fact universally admitted is worthy of profound consideration. The food contains more elements than necessary for the development of muscle (flesh) as well as of fat; the various oil-cakes and all kinds of grain on which animals are fed, contain a large percentage of flesh-forming elements, as well as a quantity of the elements which form fat; so that if the two were equally assimilated and deposited, the animals would show as much flesh in proportion as fat. Instead of this being the case, fat elements are invariably assimilated in far larger proportion than the elements of flesh. Not only so, but more remarkable still, the fatty tissues encroach upon the flesh and other parts, leading to a fatty condition of all the muscles, the fibres of the heart, the structure of the liver, and nearly every part of the body where the deposition can possibly occur.

Reasoning upon this preference for the one tissue over the other, we are required to remember that flesh or muscle is a highly organized structure, possessing vital properties; that all the movements of the animal body, the action of the heart, the motions of the digestive organs depend upon the exercise of the characteristic power of muscular contraction.

For the proper development of this important and extensively-diffused structure, not only is nutriment necessary, but also bodily exercise, which improves the circulation, increases the secretions, and, by aiding the removal of the worn-out tissues, assists the development of the new. The conditions, however, which are essential for the growth of muscle are absolutely opposed to the deposit of fat, which is not a highly organized tissue, which has no vital functions, but is a chemical substance simply deposited in a membrane of most simple construction.

Fat plays a very important part in the system; but its offices are solely chemical or mechanical. It forms in many parts soft cushions, it regulates the temperature of the body by offering the escape of heat, and its most important duty is to furnish elements for the support of respiration; elements which may combine with the oxygen of arterial blood, and by the results of the combination contribute largely to the heat of the body.

The destruction of fatty elements will be in direct proportion to the activity of respiration, circulation, and excretion; consequently exercise is opposed to the accumulation of fat, and rest favors it. An animal at rest does not inhale any large amount of atmospheric air; his circulation is slower than it would be during exertion; excretion is diminished, therefore there is but little destruction of fatty elements. If under these circumstances an abundance of those elements is given in the food, a large amount is stored up in the system, in various parts even to the exclusion of muscle or flesh, which cannot be developed although its elements are largely consumed; because there is an absence of those healthy conditions of respiration, circulation, and excretions, which are indispensable for the elaboration of so vital a structure.

An objection may possibly be made to the use of the word disease as applied to mere excess of healthy tissue. It may be urged with apparent justice, that a certain proportion of fat is necessary in the most perfect state of health, and that therefore there can be no very serious evil in an excess of what is harmless or even desirable. We have no desire to escape this position by advancing the language of the schools upon the subject of disease; but accepting the popular idea of the matter, let us suggest in reply that a small quantity only of fat is necessary, that its excess increases the size of the body without any advantage being gained; that when it usurps the place of other tissues it interferes with the functions of those parts; that a heart in such case can not properly distribute the blood; a liver so affected cannot secrete healthy bile; and that if these functions are imperfectly performed, the system must suffer according to the extent of the derangement.

In reply to the general objection that the material whose excess is characterized as disease is itself a healthy tissue, it may be observed that no structure is more healthy or of more importance to the animal than bone, and yet nothing can be conceived more dire than its deposit in the brain or the heart, or more serious than its encroachment upon other parts; a structure, however necessary in due proportion and in proper place, is even on this principle injurious in excess, or when out of its proper situation.

Nitrogen or flesh-forming elements being present in considerable quan-

tity in most kinds of food used for fatting animals, it is necessary to account for their consumption in the animal economy. The flesh being rather lessened than increased, it follows that the nutritive elements are not properly appropriated: the question then arises—What becomes of them? Many substances that would be injurious, or at best useless in the system, escape digestion by reason of their insolubility and are expelled as excrementitious; not so, however, can we get rid of all the nutritive elements of food which are digestible, and although when given in excess a large proportion may pass unassimilated, a larger portion is digested and taken into the circulation.

Without assuming any power of tracing the nitrogenized elements through the digestive process, we may form a very natural conjecture as to their destination from one fact, viz., that in fat animals there is always a large increase of the fibrin of the blood. Whatever may be the actual relations of this material to the nutritive function, it will not be necessary now to decide; but its chemical relation to the nitrogenized elements of food lends a sanction to the idea that it is derived from them.

An animal in perfect health, undergoing regular and proper exercise, and receiving a due quantity of food to supply the wants of the system, has no more than 1 or 2 parts of fibrin in 1000 parts of blood; but lessen the activity of the muscular system, or impair the nutritive function, and the proportion is immediately increased. Give an excess of food, and at the same time diminish the wants of the system by so arranging the animal's position that there shall be the least expenditure; and the fibrin will rise to 6 or 7 parts in 1000. An inflammatory attack leads to the same result by its interference with the nutrition, and curiously in extreme debility the same excess is noticed, the animal in such case literally feeding on its own tissues; thus in each instance the immediate result of non-deposition of flesh or muscle is excess of fibrin in the blood.

The state of comparative inactivity in which the animal is kept is favorable to the production of debility. Important functions, as circulation, respiration, and excretion, are sluggishly performed: the various organs, receiving therefore an insufficient supply, lose their tone, and in course of time decrease. The diminution of a structure from disease is a fact familiar to most people; even an injury, which necessitates the inaction of an arm or a leg for a few weeks, will be attended with a very perceptible decrease of bulk. Alterations so apparent in the short space of a week or two enable us to form some idea of the effects of rest continued for months, and prevent our being much surprised at the statement, that parts when entirely thrown out of use in process of time disappear.

Thus the animal is not only receiving an injurious excess of food, but

he is also placed in a position least likely to favor a healthy condition of the system. The muscular structures suffer most; but the respiratory, circulatory, and secreting organs also experience considerable injury; the inaction is only comparative, as all these parts continue to perform certain offices; but healthy activity is impossible under the circumstances of the animal's position.

The general results of the forcing system may be summed up in few words:—

By excessive feeding fat accumulates upon the surface and in the interior of the body, encroaching upon more important tissues. The blood at the same time becomes charged with the fibrinous element.

Inactivity tends to the diminution of muscle, and impairs the functions of respiration, circulation, and excretion, upon which depend the purification of the blood, the removal of effete products, and the proper action of the various vital functions.

Tissues are rapidly deposited, and are by consequence deficient in stability.

The animal prematurely attains his full growth, and as far as appearance is concerned, his perfect development.

PARTICULAR RESULTS OF THE FORCING SYSTEM.

It might be imagined that the desire to accelerate the growth of the animal and increase the bulk of the body by the deposit of fat would be limited to the breeds that are enployed for human food. Not so, however, in fact: the same anxiety to economise time affects treatment of the horse, as well as that to which the ox, sheep, and pig are subjected. The horse-breeder finds it as little to his advantage to keep his colts in a natural state until they gradually attain the adult period before he sends them to the market, as the breeder of other stock does. Society demands young, sleek, and well-fed animals to draw its carriages and curvet in its parks; it also affects young animals and despises the older and more muscular subjects, whose anatomy is too apparent to gratify its taste. Society's demand is met by the producer to the very letter: the fairs are thronged with horses in every stage of adolescence and obesity.

Upon a superficial view of the subject, it may seem very meritorious to be able to bring two and three years old horses into the market, presenting all the matured characters of the adult; but looking upon it in the light of experience, what are the real advantages? The horse is ready for use two years before he might be expected; granted this to be true, the advantage is merely a pecuniary one on the side of the dealer; can it be said that the animal's tissues are in a better condition for work at this

early period? Are the two years added in reality to his working life, or is any thing to be urged in favor of the system beyond the fact that time is saved at the commencement, and thus the markets are supplied to a certain extent with tolerably good animals, who, if kept back for two years, would leave a considerable hiatus to the inconvenience of the purchaser? Giving full weight to this very meagre defense, we can only conclude that something must be radically wrong with our system of breeding and rearing horses to necessitate the premature employment of them to meet the demand, which can not be supplied in a more legitimate manner.

It is not sought to underrate the disadvantages to the breeder, that a longer keeping of the animal would occasion; such as the risk of illness, injury, or death, added to the inevitable expenses of maintenance. This difficulty, however, is only accidental: it would seriously affect an individual, but, were it the custom not to work horses before the age of five or six years, the extra expense incurred would naturally be met by a corresponding increase of price.

Of the disadvantages of the forcing system in relation to horses we have constant and ample proof. Let any candid inquirer ask himself to what the efforts to *improve the breed* amount. On the turf, in the field, on the road, and in the stable, the object seems to be to discover how much strain upon his organism a young animal can bear. Will any one seriously hold the belief that early and severe training on one side, excessive stimulating food on the other, and lastly, work often beyond an animal's powers, are under any circumstance calculated to improve the qualities of the individual or the race? The solution of the question is given by our daily observation of the liability of these young animals to disease, and their rapid prostration under its influence; of the universal prevalence of lameness from derangements of feet and joints; of the rapidity with which the system succumbs to the effects of work; and of the mortality attendant upon maladies which in older animals are combated without difficulty. Latterly it is remarkable how quickly debility supervenes upon an attack of a comparatively simple affection. We should cease to find it curious that such is the case did we remember that the majority of young and fat horses, probably all of them, are suffering from fatty disease of the heart, liver, and other organs.

In the event of the animal escaping the first difficulties of his entry into active life, these diseased parts, under the effects of exercise and moderate feeding, are ultimately restored to a tolerable healthy state in most instances; but should he be unfortunate enough to be attacked by any inflammatory or congestive disease at the commencement, or be subjected suddenly to active exertion, the chance of his recovery from the prostra-

tion which results are indefinitely diminished by the state of the most vital organs in his body.

Without advancing a step further in the inquiry, or entering upon details which to the amateur would be tedious, enough has been adduced to prove that one particular result of the "forcing system" is to diminish the stamina of the most valuable of domestic animals, to abridge the period of his active usefulness by prematurely exhausting his powers in his youth, and to induce such a state of organic disease, that the resistant power of the system is lessened and the mortality largely increased. To compensate for the actual loss sustained, we can only discover that animals, by acquiring a precocity of development, become saleable at an early age, and so a deficiency in the supply is avoided, while the risk involved in keeping them for the period requisite for them to attain maturity is removed from the breeder to the purchaser.

PARTICULAR EFFECTS OF THE FORCING SYSTEM UPON CATTLE AND OTHER STOCK.

One very important and fundamental difference between horses and cattle lies in the fact of the latter being cultivated for human food in some form, while the former are only valuable according to the extent and duration of their physical powers. This distinction at once establishes two perfectly separate principles of action in reference to the cultivation of the horse for his mechanical qualities, and the breeding of cattle and other stock for the support of the people. Incidentally, cattle of all kinds are valuable in other respects; but it will be conceded that the essential object of their cultivation is the one we have advanced.

Under these circumstances an apparent defense of the forcing system is at once established. As the object is to supply meat for the people, the more rapidly it can be produced the better. Admitting the general truth of this proposition, it is nevertheless unfortunately requisite to insist upon certain qualifications, the main being that the amount of nutriment is of higher importance than the quantity of material that may be classified as food; hence, unless it can be shown that the meat thus rapidly produced is equal in alimentary quality to the flesh of the mature animal, the advantage to the consumer is only imaginary. Primarily, then, the point to be decided is, does the meat of the young animal, rapidly forced to full growth as it may be, possess the nutrient quality of that of the naturally matured animal some years older? If the previous reasoning is not altogether false, the question is at once answered in the negative. On the general principle first laid down, that whatever is rapidly produced is of necessity imperfect in some of its parts or properties, the notion is incon-

sistent; and on the further ground of the preponderance of the fatty tissue over the nutritious, it cannot be maintained. By the common sense of the practical observer, as by the inductive reasoning of the scientific man, the same reply would be given. Analysis and direct experiment upon the feeding properties of the two kinds of meat would alone establish the position beyond cavil; but there would be a savor of the ridiculous in the idea of a man gravely conducting a series of experiments to determine which animal would furnish the largest amount of available nutriment—a sheep of one year that had been forced by artificial treatment to his full growth, or one that had been left to acquire maturity upon a good pasture during the space of four or five years.

Animal food is a necessary of life, according at least to the prevailing belief; and it may be urged with some force that the supply must be made to meet the demand. The answer to this is easy. Were animals bred and treated with more regard to a healthy condition of the various organs, their liability to disease would be materially diminished and their power to resist it augmented, and the extraordinary losses which are sustained every year in our country would no longer be a reflection upon our agriculture. The readiness with which animals yield to the iufluence of epizootic maladies has long been a subject of remark, and we do not underrate the virulence of the disease nor the importance of any means which shall tend to prevent its importation, when we insist that a great part of the mortality is due to the predisposition of the animal's system, permanently established by our methods of breeding and management.

It is very curious to the physiologist to note how perfectly we have come to tolerate the existence of an evil; and even to claim it as an advantage: to hear the common talk and read the every-day remarks, it would seem as if "fat" were the really essential element of our food. "Lean meat" sounds unpleasantly enough in the ears of the epicure, suggestive as it is of deficiency of food or disease. A fine fat beast, on the other hand, establishes a feeling of confidence in the healthy condition of the animal. Food is estimated according to its power of fattening with rapidity, and breeds become famous in inverse ratio to the time they take to develop fatty tissue.

To attempt to combat the general idea upon this subject would be futile, the more so as it is essentially founded in truth. Leanness is typical of diseases and wretchedness, as its opposite is of health and prosperity. It is not expected of the people that they should discriminate analytically; but the practical man, who does not desire to misrepresent the principles advocated, will understand the difference between the meager subject whose condition is radically bad, and the well-developed animal whose

muscular system is in the most perfect state of development and health, and whose fatty tissues are subordinate but in due proportion to the other structures of his body. Preponderance of fat of necessity diminishes the amount of human food, not merely because the material is non-nutritive and incapable of repairing the tissues, but for the still more obvious reason that the major part of it is not consumed at all, as the process of cooking causes a large proportion to melt and run off comparatively as waste.

Again, the advantage is entirely on the side of the producer, who finding a certain and easy method of increasing almost at will the bulk of the animals required for consumption, very naturally avails himself of the materials which promise such desirable results; enabling him to prepare his stock for market with convenient rapidity, and at the same time to meet the public demand for fat meat, which the public will not eat, but feels constrained to ask for as the only guarantee that the animal was healthy and well fed.

Hence the forcing system leads to development of two palpable evils in regard to the animals which furnish meat for our consumption; it produces flesh or muscle deficient in nutritive quality, and furnishes in addition a large proportion of material, which is almost valueless as food, and is really not consumed excepting in very small quantities. Besides these disadvantages attending the present system of feeding and management, there are others even more serious; viz., the interference with the animal's health. This point has been considered in the general result; the particular consequences, however, are very apparent as affecting cattle, sheep, and pigs, as the condition induced which in the horse is remediable by exercise and proper dieting, in the other animals is fostered designedly until the beasts are placed in the hands of the butcher. Further, the influence of the want of exercise is felt in a particular degree by the organs of the respiratory system, occasioning loss of tone in these parts and rendering them peculiarly susceptible to diseases of the congestive order.

From the individual the consequences are extended to the breed. The property of acquiring early maturity is transmitted as other qualities are, and in the endeavor to perpetuate peculiar capabilities and characteristics of form necessary to preserve the race, the temptation to breed from animals of the same family is very strong; in fact these artificial qualities can be cultivated to the highest point by no other means. Gradually under such a course the natural characteristics of the animal body are lost, and in their stead are developed others which are incompatible with absolute health; to wit, muscle wanting in firmness, excess of fatty tissue, defective secretion, loss of tone of the respiratory and circulatory organs, fatty disease of liver and heart, predisposition to disease, and want of

power to resist its effects. On the other side, he may place the rapid increase of the bulk of the animals, aiding to keep the supply of meat at a certain average; and compensating to some extent for the enormous yearly losses resulting from disease, acting upon animals eminently predisposed to its attacks.

Accustomed as we are to speak of the great improvements that have taken place in the various cultivated breeds, it is not to be supposed that we can at once accept the idea that all the work has been in vain, and that in our endeavor to advance, we have only succeeded in retrograding; indeed, it is not likely that such an admission will be made by any who are personally concerned. Opinions differ widely upon all subjects, and whether an object be legitimate or not it will find defenders. If by improvement of the breeds of cattle, sheep, and pigs, we mean the rapid growth of the animal, the early development of fat and the attainment to premature maturity at the expense of the perfection of the organism, then the system has succeeded. But to say that our efforts have tended to improve the health of our animals, to diminish the liability to disease, to produce a larger supply of nutritious food for the people, is to make an assertion which is opposed to all the evidence bearing upon the subject.

Practically, what is to be deduced from all that has been advanced—assuming it to be true? It is not with any idea of altering the present system that we have discussed the question: the motives for continuing the same course are too urgent in our commercial age to be easily set aside. On what plea will the breeder retain his sheep until they are four years old, when he can dispose of them at nearly the same price to the butcher soon after one year? That the four-year-old mutton is better for the people might weigh with him as a philanthropist, but would offer meager consolation for the pecuniary disadvantage he would sustain. Under exceptional circumstances, the value of the fleece may constitute a reason for keeping certain animals for an extra season or two; but speaking as we are in reference to the cultivation of animals for meat, there are literally no practical reasons likely to induce the breeder and feeder to keep them beyond the time absolutely necessary to force them to the condition in which they will be considered fit for the butcher.

At last, therefore, we can only deplore the state of affairs without even indulging the hope of a change for the better. In spite of everything that can be urged, cattle *will be* overfed and disease *will be* induced. Horses *will be* brought early to the markets in a state of plethora, and the result *will* continue to be premature decay.

But there is some satisfaction in knowing even the worst: at least it is preferable to acting under an universal delusion. We are ready to admit

that remarkable results have followed the efforts to improve the breeds of stock, results not satisfactory in the main, but not the less decided. We accept the proofs of what can be achieved by systematic attention to a definite object; but we do not the less contend that the system has been carried too far. The principle has been all along that of the railroad; the struggle to drive onward rapidly at all risks, even without considering them. The cry has been for the animal that will be the first ready for the carriage, the saddle, the dairy, or the butcher, and so far the demand has been answered; at what cost we have endeavored to show. Whatever respect may be accorded to our suggestions, we may at least ask that the "forcing system" shall no longer exist under a false designation, that men shall not in future speak of the artificial induction of disease, of premature development, and of systematic degeneration, under the imposing terms—CULTIVATION AND IMPROVEMENT.

New Cavendish Street, Portland Place.

WHAT PLANTS FEED ON, AND MINERALS IN THE ASHES OF PLANTS.

If we carefully review the course of development of the doctrines concerning the nutritious materials which plants draw from the water and earth, it will be seen that the inorganic constituents which plants appropriate, were at first considered merely accidental, and long afterwards it was substantiated that plants *select* these constituents which may thus be considered as nutritious elements. At first it was supposed that the quite undetermined substance, *humus*, was the true nutriment in the soil, and when the astonishing influence of marl was seen, it was thought that this material only made the insoluble *humus* soluble, and thus brought it into a condition in which it could be appropriated by the plants.

A great step of progress was made when it was ascertained that cultivated as well as wild plants select the necessary materials for their development and reject what is indifferent or injurious to them. This is rendered plain by an examination, easily made, of the roots of plants growing in sand marl. These roots are seen to surround themselves gradually by a layer of almost pure carbonate of lime, which has been dissolved by means of the carbonic acid in the water imbibed by the roots; but which could only be retained in very small quantities, if at all, by them, as it would only be useful in the growth of the plant, if so at all, in very small quantity. A similar observation may be made with respect to roots which penetrate deeply into ferruginous sand, which cover themselves with a casing, not of lime, but of oxyd of iron, in combination with water, which spreads itself gradually until the roots can no longer absorb water and with it the elements of nutrition, and then die. In this case the iron has also been dissolved in the water, but not probably as an oxyd, but as a carbonate, and of which a greater or less portion has been appropriated by the plants. We find traces of iron in all plants, and the superfluity has been rejected, as we saw in the case of the lime. We now know by direct examination that water containing carbonic acid is the chief solvent of plant-nourishing materials found in the earth, because

very few of such materials are soluble in pure water. From experiments of Boussingault and Levy, we learn that in cultivated grounds the masses of carboniferous materials are brought in contact with and subjected to the influence of the air, and are thus slowly converted into carbonic acid, which in its own character, and also as a solvent of minerals needed by the plant for its development, affords an abundance of nutrition to the plants. A soil, therefore, which contains much carboniferous, organic matter, and which naturally is porous, or has been made so by art, or, as commonly said, is mellow, always presents the necessary condition of fruitfulness. This porous condition of the soil permits the entrance of much atmospheric air into its interstices, which thus becomes a rich source for the production of carbonic acid, and is also a powerful means of bringing the inorganic materials needed by the plant for its development into contact with it.

The question which chemists who have engaged particularly in investigations in reference to the nourishment of plants by the soil have endeavored to answer may be raised here: "*What matters in the soil and water do plants require for their perfect and thorough development?*"

The most important plant-nourishing materials are:—*Silicious earth*, particularly for all the graminaceal; *phosphoric acid*, found in greatest abundance in the seeds of plants, and seemingly necessary for the development of this most important part of the plant; *sulphuric acid*, which appears not to be wanting in any of our cultivated plants, but which in some families plays a peculiar and important part; *lime* is a constant constituent in our cultivated plants, and occurs in great numbers of uncultivated growths; *alkali potash*, which, by means of its great tendency to form (acid) salts, plays an important part in many plants which bear sweet-sour fruits, as the vine, is scarcely lacking in a single plant. Besides, *soda*, *magnesia*, and *chlorine*, are more or less distributed through the vegetable kingdom. I have here enumerated the most important and best known inorganic materials, found in the ashes of plants; but the hope which led chemists to make such patient analyses, the hope of finding such characteristic compounds as would lead us to a rational and scientific method of culture, founded upon the composition of the soil and the combinations found in plants, has been realized in only a very slight degree. It is thus easily explained why men, who at first seized the chemical doctrines of agriculture with avidity, have discarded the whole thing because they found their expectations completely disappointed.

Some years since I published a treatise, in which I noticed that analyses of soils heretofore made had not been conducted with the care and exactitude which were necessary, if a person wished to draw conclusions from

them in regard to the nutritious materials appropriated by plants from the soil. I then demonstrated that analyses should give the constituents with an exactness which reaches to the ten-thousandth part of the whole mass subjected to analytical examination. The remarks I intend making now are merely a further development of this proposition.

Examinations made, not in regard to the particular question under consideration, but to elucidate the principles of the development of the earth, have demonstrated that metals in a small but tolerably constant proportion, exist in those rocky masses which have burst forth in fluid or almost lava form from the unknown depths of the earth. When these melted and afterward hardened substances were exposed to the weather, they were broken down into loose earth, and being carried away and deposited by water, they formed other species of stone, and at the same time the metals were carried along with and deposited like the principal substances. Again, our present earth's surface is formed of the products of the disintegration of all the earlier rocks, as well of those which came melted from the depths of the earth as of those which were deposited by water, in seas and lakes, and here too the metals accompany all the remaining substances, and the soil of our fields and gardens contains iron, manganese, copper, lead, tin, zinc, cobalt, nickel, and sometimes silver and bismuth; and it is very probable that the other metals, which I have not found in the quarry or the soil, exist and will be found when experiments are carried on to answer the question above fully. Among the substances not reckoned among the metals and not heretofore known as an actual constituent of the soil, I have found barytes.

The thought that these materials may be taken up by plants according to their peculiar nature, now seemed justified. In short it seemed probable that these metals, which occur in the soil in very small quantity, do, nevertheless, enter with a certain degree of regularity into the composition and aid definitely in the development of plants. Early experiments, it is true, were not wanting, but because they stood alone, they did not exert the influence they should have done upon considerations of the conditions necessary for the development of the bodies of plants. It has long been known that iron occurs in the ashes of most plants, and not a few agricultural chemists have considered iron as a necessary material for the nutrition of plants. Besides, it has not escaped the notice of analysers that manganese occurs in relatively large proportions in the ashes of most plants, and, in reference to this metal, a nice little circle of characteristic influences may be pointed out. The most of my readers have doubtless remarked that the snail-shell, whose inhabitant lives upon trees and bushes, has sometimes brown rings and a brown lip at the opening of the

shell, and naturalists determine different species of helix by the presence or absence of this brown color in the lip of the shell. These rings and lip owe their brown color to reduced manganese. The soil gave it to the plants and these to the animal, and the snail is so closely related to this occurrence of manganese in plants, that the species can not exist without it in the plants upon which it feeds; but this manganese certainly plays a more important part in the internal economy of the animal than merely that of ornamenting its shell. If the manganese be necessary for the snail, it would be very strange if we came to the conclusion that it was a matter of indifference to the plant, in its development, from which plant the snail derives its nourishment, and we thus come to the conclusion that this metal is at least an actual and real constituent of the plant in which it is found. Next, many chemists, in the course of the last ten or fifteen years have discovered copper in plants, and others again have discovered this copper in no inconsiderable quantity in the shelless snail, which is so great a pest to agriculturists and horticulturists. The regularity with which copper is found in our most cultivated plants, e. g. wheat, and from which the snail which lives upon them derives it, induces us to suppose the great probability that copper is also a necessary constituent of many plants.

This observation in reference to the occurrence of copper in plants was enigmatical so long as the wide-spread distribution of copper in the soil was unknown. My experiments, heretofore mentioned, have cleared up this difficulty, and they also induce me to seek the metals and other materials found in the soil, regularly, though in minute quantities, in the plants nourished by the soil containing them. To obtain an answer to this question in such a manner that not a doubt would remain, that man, who with his wilfulness and peculiar requirements is always interfering with the quiet developments of nature, had had any influence, I selected for my experiments partly our common forest trees, which grow without the soil having been modified by man, and partly turf, which is formed of the remains of vegetables which also grew without man's interference. I consequently examined beech ashes, which, as is well known, contain large quantities of potash, but in which I now found, as my attention was directed to the metals, lead, copper, and tin, besides the far more abundant and wide-spread metals, iron and manganese. I next examined the ashes of the oak, in whose ashes the metals are far more abundant than in the beech, and found iron, manganese, copper, tin, lead, zinc, cobalt, probably nickel, and besides, barytes. In the ashes of the fir tree I found proportionally more tin, a very small quantity of copper, and still less lead, next barytes, besides iron and manganese. I examined the birch tree

also, and found, besides iron and manganese, tin, copper, lead, and a relatively large quantity of barytes. In turf ashes were found copper and tin, probably nickel, besides iron and manganese. To examine a tree from the tropics I selected the mahogany, which left an ash upon being burned very rich in iron, whose quantity of ashes formed nearly one per cent of the weight of the tree. These ashes contain, of the matters here in question, a relatively large quantity of copper, a small quantity of lead, an important quantity of tin, and a trace of zinc.

From all these examinations one is led to believe that these metals, as well as barytes, are necessary constituents of the plants examined, and a person is induced to believe them as indispensable as phosphoric acid, potash, and lime. That they occur only in such small quantities in plants, and yet perform such an important part in their life and development, may be explained by saying that they are in part poisonous, as copper and lead, and in part are very energetic in their operations, as all the others, including barytes, and only small quantities can thus produce powerful effects.

If we could present the peculiarities of these matters in the economy of the plant, and point out the difference between these and the before named substances, which play a part in some plants, and group themselves according to the different organs of the plants, as potash in the fruits, phosphoric acid in the seeds, and silicic acid in the fibres, &c., we might perceive that these are joined to particular families of plants, and stand forth as constant constituents of them. We have as yet but little experimental knowledge with regard to the distribution of poisonous and energetically acting materials in the vegetable kingdom, but we are in possession of some observations which point to a law of the kind I have designated. These relations become evident much more readily when we take salt water plants into consideration, than in the more highly developed plants, partly because they contain much larger quantities of inorganic matters, and partly because the conditions under which they are produced are much simpler, as they draw their nutrition almost exclusively from the surrounding salt water. With regard to these plants, and particularly with regard to the proper *tang* species (kelp?) it is well known they contain a substance known as iodine, and which is found in such small quantity in sea water that the most delicate analyses alone can detect it, and that we do not use sea water for the production of iodine, in which it originally belongs, but plants which have already collected it. Among the *tang* species there is one species, the *laminaria*, used almost exclusively for the production of this rare material. The *laminaria* are the *iodine plants*.

Another of our salt water plants which we also call *tang*, (tong) although it belongs to an entirely different species, is the *bendel tang* (string seaweed), *zostera marina*. This plant extracts manganese from sea water in which it occurs in only such minute quantities that the finest analysis alone is able to detect it, but the *zostera marina* contains it in such quantities that when its ashes are subjected to the action of hydrochloric acid, chlorine is developed freely, just as it is developed when brown stone, the most important manganese ore, is exposed to the action of the same acid. This manganese must exist in the plants in a soluble combination, because when the plant has been exposed to the influence of the sun, wind, and rain, upon our sand beaches, only a minute portion of the manganese is found remaining, and to find it in a large quantity, fresh and perfectly-developed plants must be selected toward the fall of the year. *Zostera marina* is a *manganese plant*.

Upon the so-called Galmeiberg—calamine mountain—near Aix-la-Chapelle, there occurs a little violet peculiar to that region. It has been called calamine violet, (*viola calaminaria*). It contains zinc, and is so characteristic for this ore of zinc, *calamine*, that it will only grow upon deposits of calamine, and it has been used as a guide in the detection of new deposits of this important zinc ore. When it is planted in gardens it changes its nature and appearance, probably because the soil does not contain a sufficient quantity of zinc to secure its development. This *violet* is a *zinc plant*.

Is it not now probable that in time, and by means of continued examinations, we shall find copper, lead, tin, cobalt, nickel, and barytes, plants, nay, that every metal which has not yet been found in the vegetable world, has nevertheless its particular plant, of which it is characteristic. A French chemist in the last century affirmed that he had discovered gold in the vine, and this assertion was entirely neglected, as it was made at a time when chemical analyses were not very exact, and because it did not conform to our then circle of scientific knowledge, but it deserves to be taken up anew, and examined with all the means of assistance which more modern analyses afford.

So much at least is rendered evident by these examinations, that metals have a part to perform in the vegetable world; that a lack or excess of them in the soil must have a decided influence upon the growth and development of plants. If wheat always contains copper, which seems to be evident, from the analytical examinations made, we are justified in the supposition, until the contrary is proved, that a soil which does not contain copper is not suited to the culture of wheat, and it is not improbable

that an increased quantity of copper in the soil will have a decided influence upon this plant's successful growth.

Every one who has cultivated plants has, more or less, felt the danger of the enemies which have beset nearly all our cultivated plants during the last few years, in the form of a multitude of small, low organisms, which produce, or at least evidence diseases in these different plants. We know these diseases as rust or smut in wheat, the potato disease or rot, mildew in the grape, or vine disease, olive tree disease, and some years the currant and gooseberry have been attacked by like plagues. The causes of these diseases are probably of very different natures, but most vegetable physiologists agree that the fungus or fungoid organisms which occur as an external sign of disease, can only obtain their power over the plant when it has already become weakly. As it now appears settled that a small quantity of the above mentioned inorganic substances forms a necessary condition for the well-being and development of plants, the question, whether an entire lack, or a too small quantity of these energetic mineral substances in the soil may not induce the sickliness of plants, which sometimes assumes the character of epidemics among the human race, deserves particular attention.

All agree that this sickliness of plants is in a great degree owing to excessive cultivation, that is to say, to the active interference of man to produce a rich yield of the given plant. But in this expression, "excessive cultivation," there lies a great uncertainty in regard to the changes which grow out of it in the soil and the plants. Over culture—excessive cultivation, may have the effect of making the soil too porous, so that it may become surcharged with organic matters, and be brought into a state of unhealthy fermentation, or by means of the atmospheric air develop too large a quantity of carbonic acid, and an excess of this may act injuriously upon plants, by favoring the abstraction from the soil of too large quantities of inorganic matters, or by favoring the accumulation in the soil of other inorganic elements.

I will now propose as a subject for more exact examination, whether one effect of excessive cultivation may not consist in this, that the energetic mineral substances which form the subject of the present communication, have been extracted from the earth in a relatively too large quantity, so that the plants cannot obtain a sufficiency of them for a perfect and vigorous vegetation.

It has been demonstrated by my experiments that the rarer metals in the ashes of plants, taken altogether, stand in a different relation to iron from what they do in the soil, there being, relatively, a much larger proportion of the rarer metals taken up by plants than of iron. This is ap-

parent first with manganese, while we are unable, in a large proportion of our different kinds of soil, to demonstrate, except with great difficulty, the existence of manganese, it can be shown in the ashes of plants with the greatest facility, and while generally very peculiar means are required to demonstrate the other metals except iron, in the soil, the existence of copper, lead, tin, &c., in the ashes of plants, can be evidenced by very simple chemical operations. Here, then, a concentration, a collection of these rarer matters has accrued, caused, doubtless by the solubility of their ores in water charged with carbonic acid. Let us consider, now, the peculiar mode in which manganese occurs in sea-weeds: It is in combinations soluble in water, probably with organic acids. As the manganese becomes insoluble in water upon burning the plant and it is not at all unreasonable to suppose a similar condition of the other metals, it follows again that they would be exposed, upon the rotting of the plants, to be washed away, and the soil would thus lose more rapidly these, according to all probability, highly necessary constituents of a luxuriant vegetation. A consequence of these relations is that the soil must lose these materials by means of active cultivation, and our manures are not able to replace them in a sufficiently large quantity.

It lies in the nature of the matter that the propositions here laid down must be uncertain as yet. The matter is too new, and our observations have been in this regard too limited to cause us to stop, satisfied with our investigations, but we should strive for a far more extended experience before we consider the matter established and decided; and the object of this communication is especially to direct the attention to these substances, which have not hitherto been considered as plant-nourishing. If only a small part of what I have here expressed, as based upon my own and other chemists' experiments, be confirmed by future experiments and observations, an actual progress in our theoretic sciences of the nourishment of plants will have been made, as well as in our practical knowledge of the means of calling forth a strong vegetation.

I will now close this series of remarks with a definite proposition. It is well known that a much-used, and according to my experience, very useful means of preventing smut in wheat, is to soak the seed in a weak solution of blue vitriol, (*sulphate of copper*). If the remarks I have before made are not without foundation, then the copper serve to supply the young plants with this productive materials for nourishment, and thereby protects it from the attacks of those lower organisms. My proposition is that the same experiment be made with the potato; that when planting they shall be carefully soaked or moistened with a very weak solution of blue vitriol. It must not be forgotten that copper is a very poisonous

substance, and too much of it would kill the young sprouts. I intend to dry out or wilt some potatoes, and then soak them out in a solution of one part blue vitriol and a thousand parts of water.

CHEMICAL PHYSIOLOGICAL CHARACTERISTICS OF THE VARIOUS FORAGE PLANTS.

The following pages are devoted to an examination of the various forage plants, and, without further preface, we commence with one of the most important, namely, the varieties of clover.

CLOVER.

The principal varieties of clover and their organic composition, according to the analysis of the same will be found complete in the following table:

	Water.	Protein substances.	Nitrogenous substances.	Woody fibre.	Ashes.	Proportion between Protein substances and Nitriogenous substances.	Authority.
RED CLOVER newly mown (*Trifolium pratense*)							
From Hoenheim before blooming..........	87.4	3.3	4:2	3.7	1.4		Emil Wolff.
" " during "	88.1	2.8	6.0	6.7	1.4		" "
" " after "	80.9	2.2	6.0	9.6	1.3		" "
" Mockern beginning to bloom........	88.1	3.2	8.1	4.2	1.4		" "
" " in full "	76.4	2.9	10 1	8.9	1.6		" "
" " very young...............	83.9	4.0	6 7	3.8	1.4		Ritthausen.
" " in full bloom..............	79.5	3.3	8.9	6.7	1.6		"
" Cirencester beginning to bloom......	81.0	4.3	9.1	3.8	1.8		Way.
" " in full "	80.6	3.6	....	....	1.9		Voelker.
" Moglin beginning to "	81.5	3 0	....	....	1.3		Eichhorn.
" Elsaz before "	82.4	2.7	9.1	4.2	1.(		Boussingault
" " in full "	77.0	3.1	12.2	6.3	1.4		"
" Gollmitz in full bloom..............	71.3	3.3	15.9	7.2	2.3		Hellriege
" Boitzenburg in full bloom	79.9	2.4	10.0	5.9	1.8		"
" Proskan, first cutting...............	76.4	6.2	10.3	5.3	1.6		Halwa.
" " second "	80.0	5.9	7.8	4.6	1.7		"
Mean......................	79.3	3.7	9.6	5.8	1.6	1:2.6	
Average analysis of 14 samples of clover	79.7	3.9	9.1	5.3	1.9	1:2.4	Way.

	Water.	Protein Substances.	Nitrogenous substances.*	Woody fibre.	Ashes.	Proportion between Protein substances and Nitrogenous substances.**	Authority.
RED CLOVER HAY.							
From Hohenheim, second cutting	16.7	9.6	26.5	41.7	5.6	....	Wolff.
" Bickendorf, end of blooming.........	14.5	13.6	32.4	32.2	7.2	....	Grouven.
" Rudigsdorf, full bloom..............	19.8	14.0	22 3	35.7	8.6	....	F. Crusius.
" Dahlen (manured) out of bloom.....	12.9	15.4	15.2	48.1	8.3	....	Ritthausen.
" " (unmanured) "	13.0	10.6	23.7	46.2	6.3	....	"
" Bechelbrom, full bloom..............	20.0	10.6	42.4	22.0	5.6	....	Boussingault.
" Frankenfeld, 4 inches long...........	14.7	18.3	37.0	18 8	11.2	....	Stockhardt.
" " beginning of bloom	13 0	14.8	39.5	24.0	8.7	....	"
" " end "	14.2	10.7	37.5	30.9	6.7	....	"
" Wende, 1857........................	1 .1	10.2	38.2	27.5	7.0	....	Henneberg.
Mean........................	15.4	13.1	30.6	33.3	7.6	1:2.4	
Average analysis of 14 samples........	16.6	15.8	37.6	22.5	7.6	1:2.4	Way.***
WHITE CLOVER (*Trifolium repens.*)							
From London, in bloom..................	83.6	4.5	....	...	1.6	....	Voelker.
" Cirencester, beginning to bloom	79.7	3.8	9.0	5.4	2.1	....	Way.
SCARLET OR INCARNATE CLOVER (*Trifolium incarnatum.*)							
From Cirencester, beginning to bloom	82.1	2.9	7.4	5.8	1.7	....	Way.
" Bickendorf, (dry hay) end of bloom..	17.2	11.5	33.9	31.9	5.4	....	Grouven.
SWEDISH CLOVER (*Trifolium hybridum.*)							
From Mockern, before blooming..........	86.9	2.6	5.5	4.0	1.1	....	Wolff.
" " at the end of blooming.....	82.6	2.4	8.4	5.1	1.4	....	"
" " before "	80.3	5.7	8.4	3.8	1.7	....	Ritthausen.
" " at the end of "	80.2	3.0	6.7	8.6	1.5	....	"
" " fully ripe	15 7	10.2	21.2	48.8	3.9	....	"
" Dahme, dry hay..................	16.7	9.1	44.5	24.9	4.7	....	Hellriegel.
BLACK MEDIC. (*Medicago lupulina.*)							
From Hohenheim, close of bloom.........	76.7	3.2	10.8	7.6	1.7	....	Wolff.
" Cirencester, beginning of bloom	76.8	5.7	8.7	6.3	2.5	....	Way.
LUZERNE (*Medicago Sativa.*)							
From Elsasz, commencement of bloom.....	80 4	2.8	10.4	5.1	1.3	...	Boussingault.
" Cirencester, in full "	69.9	3.8	14.4	8.7	3.1	....	Way.
" London " "	73.4	4.4	....	....	3.1	....	Voelker.
" Moglin, beginning of "	81 9	3.1	...	....	1.4	....	Eichhorn.
" Mockern, before "	81 9	6.2	6.0	4.0	1.9	....	Ritthausen.
" " beginning of "	72.5	4.9	6.9	13.4	2.4	....	
ESPARSETTE (*Onobrychis sativa.*,)							
From Cirencester, beginning of bloom.....	76.6	4.3	11.4	5.8	1.8	....	Way.
" London in full " ..	77.3	3.5	....	....	1.7	....	Voelker.

* This column includes starch, sugar, dextrine, pectrine, gum, fat, wax and extractive matter. ** The actual proportion of the nutritive substances is not given herein, because it can be calculated only, if the fat is also taken into consideration. *** From this it appears that the English hay is more nutritious than hay grown elsewhere.

Way states the average amount of fat-forming substances found in 14 analyses of different varieties, at 0.75 per cent., in green clover, and at 3.18 per cent. in clover hay. The results obtained by Eichhorn, Stockhardt and Boussingault nearly corroborate this statement. The latter found the average of fat-forming material in green clover to be 0.9 per cent.; in clover hay, 3.2 per cent. This amount of fat-forming substances is worthy of serious consideration in experiments in feeding.

The most essential points connected with the above analyses are as follows:

1. The great value of clover, as a nutrient in general, founded on its digestibility and richness in protein. The latter makes it a forage richer in protein than grain, which possesses only half as much protein in one part of non-nitrogenous nutritive matter. But grain is a more concentrated food than clover, because, in quantities of equal weight, it contains more assimilable nutritive substances, i. e., a very small amount of such substances as have no nutritive value, and are only a nutritive ballast. Since the amount of nutritive matter found in clover by analyses does not meet the theoretical expectations, in its nutritive effects, as far as observed, this failure was formerly ascribed to the woody fibre in the clover, in so far as it, by incrustating the nutritive substances contained in the cells of the plant, makes them less digestible and thus partly inefficient. This view, first advanced by Wolff, and then amplified to the extreme by the assertion that the nutritive substances in a fodder become the less available the more woody fibre is contained therein, was not endorsed by some vegetable physiologists who suggested another explanation. The latter is now confirmed; the incrustation by the woody fibre does not cause the slight effect of clover, for it has been shown that one-half of the woody fibre is digestible; but it is occasioned by those soluble substances shown by analyses to have no nutritive value at all, because they are organic combinations, bearing no similarity to the nutritive character of the pure protein matter, or to that of sugar and starch. Different amounts of such unknown extractive substances are contained in the forage plants, and, according to my investigations of this subject, stand in no proportion to the amount of the woody fibre. In explanation of this an analysis of a sample of Lucerne-esparzette hay is here given, in which the strictly nutritive portion is separated from the dissolved indifferent substances destitute of nitrogen.

PER ONE HUNDRED OF HAY.

Water	16.2
Protein substances	11.7
Fat	2.7
Saccharine substances, reduced to starch	16.5

Unknown combinations, destitute of nitrogen	11.6
Woody fibre	31.1
Ashes	8.1

From the figure representing the woody fibre, 0.100 of ashes and 0.184 of protein have been deducted already, which were still found in the cellular matter, according to the method adopted. But as long as we do not know positively whether the gastric juice of the animal may not exert a greater solving influence upon the protein than the 5 per cent acids and alkalies of the chemist, we would not be justified in supposing that the greatly varying amounts of protein found in all analyzed woody fibres would not have any nutritive effect, just because they are inclosed in the woody fibre.

2. A comparison of these analyses of green and dry clover, i. e., of clover mown at the beginning of the period of blooming, or toward the end of the blooming season, shows, without exception, from the period of its first growth to its maturity, *a constant increase of dry matter; a regular decrease in the percentage of protein substances, and a continual increase of the woody fibres.* These facts explain several practical observations long since made.

a. Young clover is more nutritious than dry clover, for the former is relatively richer in protein, and although it contains a larger per cent. of water, yet the larger amount of dry matter in old clover is not a direct advantage, since this *plus* consists, chiefly, of indigestible woody fibre and similar indifferent substances, making the stem of the plant hard and less palatable. 100 lbs. of young clover, cut before blooming, therefore will, despite its large amount of water, be as nutritious as 100 lbs. of dry clover cut at the end of blooming. But if both are made to hay, so that the amount of moisture in either become equal, (16 per cent.), then 100 lbs. of hay of young clover will probably be as nutritious, and worth as much as 120 to 150 lbs. of hay of old clover.

b. An animal can eat more young clover than old clover. In 100 lbs. of the former are contained 20 lbs of dry matter, but in the 100 lbs. of old clover, 30 lbs. If a cow cannot consume more than 25 lbs. of dry matter per day, in a ration, perfect in every respect, she cannot consume 100 lbs. of old clover, but only 84 lbs, (30:25—100:x). But she will eat 125 lbs. of young clover (20:25—100:x), before her stomach is filled. The 25 lbs. of dry matter in the 125 lbs of young clover, possesses, probably, one-half more nutritive power than the 25 lbs. of dry matter in the 84 lbs. of old clover. The cow, therefore, fares much better by the former, and can produce more milk and meat. Even if she gets only 84 lbs. of young clover, she will have this advantage over another cow that gets 84 lbs. of old clover, that she still has an appetite for other fodder, while the latter will have no desire for eating straw besides.

c. It is customary to cut clover when it begins to bloom. If it were mown before blooming, the hay would of course be of better quality, but the loss in quantity occasioned by the undeveloped state of the clover would be too heavy; if cut at the end of blooming, then the larger quantity of hay would be counterbalanced by its inferior quality, and, besides, the second cut would be too late in the season. Doubtless, it is better to cut clover rather too soon than too late.

d. Cattle are subject to gaseous swelling in spring, if they can fill themselves with quite young clover in the pasture or in the stable. The cause of this is partly, because an extraordinarily large amount of proteïn is contained in young plants, partly the proteïn in young plants is easily soluble, and, therefore, occasions the development of much gas in the stomach.

8. The comparative analyses of manured and unmanured clover show that the quality of the clover crop, like that of all other cultivated plants, depends greatly on its cultivation and on manuring. A field manured with very nitrogenous manures (saltpetre, guano, bone-dust, compost, &c.), will produce not only a larger quantity, but also more nutritious plants than any adjoining unmanured field. In general, plants of a luxuriant growth are richer in proteïn substances than those of a poor and weak growth.* They are a more valuable food, and also produce a better manure. Of a field of dark green and vigorous forage plants, the farmers say "it has a *fattening* growth."

It is not difficult, by means of manuring alone, to grow on one and the same field, clover hay worth 50 per cent. more than that grown on another part.

A clover crop treated with mineral manures (wood ashes, lime, plaster, peat ashes), sometimes shows a more luxuriant growth, but the farmer should not be deceived by the larger weight of the crop, which consists, according to accurate investigations, of water chiefly. The results of the experiments instituted by Ritthausen are here quoted, viz.:

	Yield of red clover. Per square yard.	Air dry matter.
Without manure	450 grammes.	197·8 grammes.
Manured with ashes	542 "	188·6 "
Manured with plaster	809 "	174·5 "

Similar, although not so striking, results were obtained by Hellriegel at Dahme, and by Hullwa at Proskau.

---

* This may be proved by a multitude of analyses, but one only, by Stockhard, will be sufficient, viz.:

	Percentage of nitrogen in oat plants. Periods of growth. I.	II.	III.	Daily increase of the plants in weight in 96 days. Per acre.
Unmanured	0·82	0·77	0·59	.... 22 lbs.
Guano and saltpeter..	1·89	0·90	0·87	.... 64 "

To what degree the soil influences the nutritive power of forage plants may be learned of farmers who have moved from a heavy, cold soil to a light, humus soil, or from a well-manured farm to one with poor fields. They soon observe that the fodder did not benefit the cattle so much on the one farm as on the other, or in another district.

4. On a general average, 100 lbs. of green clover or Lucerne will give 25 lbs. of hay; 1 lb. of the latter should possess the nutritive value of 4 lbs. of green clover. To this conclusion many practical agriculturists do not accede, because, they say, green clover is, proportionately, more nutritious than dry clover, so that not more than 3 lbs. of the former will be equivalent to 1 lb. of hay. Thus a large proportion of the nutritive value of clover should be lost by the process of curing! Is that possible? Is this opinion not erroneous? No loss in nutritive substances is occasioned by drying, because the water only, which possesses no nutritive value, is lost, and the softness of the stems of the plants, or their hardness and indigestibility, are not immediately dependent on its presence, for the latter qualities depend more on the age of the clover and other conditions of its growth.

Yet if the experiences of these practical farmers were true, they could be explained in no other way than by the fact that, generally, an older, less nutritious clover is made into hay, while the youngest and juiciest is chosen for green fodder, or that, in the curing of the hay, the dry plants possess a varying smaller amount of nutritive matter, occasioned by the loss of leaves or by heavy, soaking showers. That such experience is more than doubtful in a physiological point of view Boussingault has shown by the following experiment:

A heifer, 10 months old, was fed, during ten days, with as much green clover, accurately weighed, as she could eat. When, for instance, she ate 45 lbs. per day, precisely that number of pounds of the same clover were carefully dried without any loss of leaves, and preserved as hay. After ten days Boussingault ceased feeding her with green clover, and during the following ten days she was fed with hay made of the same quantity and quality of green clover. The weight of the animal at the end of either trial was to show the difference of the nutritive power in green and dry fodder. The following table contains the results of the experiment, which was thrice repeated by Boussingault:

	Weight of the animal on the 1st day	During 10 days, fed with green clover, which weighed—	Weight of the animal at the end of the 10 days.	During 10 days, fed with clover hay, which weighed—	Weight of the animal at the end of the 20 days.
1st experiment	270 kilos.	286·0 kilos.	267 kilos.	72·4 kilos.	272 kilos.
2d experiment......	306 "	275·5 "	301 "	74·6 "	308 "
3d do meadow grass	329 "	414·0 "	333 "	87·7 "	348 "

According to this, the hay had rather more than less nutritive power than the corresponding green clover. Yet the differences in the live weight at the three trials are so small, that these results can hardly be considered reliable.

5. The nutritive power of the different varieties of clover are stated in the analytical table. It shows, for instance, that white clover is somewhat more nutritious than red clover; that the Scarlet clover is not as nutritious as Swedish clover, &c.

6. *Which is more profitable—to let cattle and sheep grase in the clover field, or to mow it?* This question is answered pretty definitely by an experiment instituted by Ockel at Frankenfeldt, and commented on analytically by Stockhardt.

A clover field of uniform growth was divided into three equal parcels. Parcel I was mown six times between the 29th of May and the 24th of August, and every time manured with a little guano, in order to supplant the excrements of animals grazing on it as a fertilizing agent for the clover. Parcel II was mown twice—on the 15th of June at the beginning of blooming, and likewise on the 24th of August. Parcel III was mown on the 7th of July, toward the end of blooming, and the second time on the 24th of August. The crops and cuts of said two parcels were carefully gathered, weighed, dried and analyzed, and the results were as follows:

	Yield in pounds per Prussian morgen.			
	Clover hay.	Protein matter.	Substances destitate of nitrogen.	Woody fibre.
Parcel I (grased)............	3,420	615	1,291	687
Parcel II (beginning of bloom)	6,300	841	2,389	1,662
Parcel III (end of bloom)....	6,750	762	1,623	1,954

Thus, grazing a clover field would not be as profitable by far, as mowing it. If a sheep eats daily 2 lbs. of hay, then only 20 sheep could have been sustained from the 29th of May to the 24th of August, on parcel I, while the crops from parcels II or III would have yielded the same amount of food for 38 sheep fed in the pen. But in this calculation the difference in the nutritive value of the hay has been omitted, it being less on parcel III than on parcel II, and considerably less than on parcel I.

MEADOW GRASSES.

The meadow grass is a mixture of heteorogenous plants differing in smell, taste and composition. Its nutritive value is more or less, according as the one or the other meadow plant is predominant among it.

In respect to their quality the grasses may be enumerated in the following descending series:

Botanical Name.	*Common Name.*
Lolium italicum	Italian Ray grass.
Phleum pratense	Timothy.
Poa annua	Annual meadow grass.
Cynosurus cristatus	
Bromus mollis	
Dactylis glomerata	Orchard grass.
Hordeum pratense	
Alopecurus pratensis	
Arrenatherum avenaceum	
Lolium perenne	
Festuca duriscula	
Avena pubescens	
Anthoxanthum odoratum	Sweet-scented vernal grass.
Poa pratensis *	Kentucky Blue grass.
Holcus lanatus	
Poa trivialis	
Avena flavescens	
Briza media	

We are indebted to that celebrated investigator, Way, for the commentary on this enumeration, who, in 1849 and 1850, subjected these grasses to an accurate chemical analysis. He gathered them on the meadows of Cirencester, while they were in full bloom, between the 8th of May and the 19th of July.

Name of Grass.	Water.	Protein.	Fat.	Non-nitrogenous nutritive matter.	Woody fibre.	Ashes.
Anthoxanthum odoratum	80.35	2.05	0.67	8.54	7.15	1.24
Alopecurus pratensis	80.20	2.44	0.52	8.59	6.70	1.55
Arrhenatherum avenaceum	72.65	3.54	0.87	11.21	9.37	2.36
Avena flavescens	60.40	2.96	1.04	18.66	14.22	2.72
Avena pubescens	61.50	3.07	0.92	19.16	13.34	2.01
Briza media	51.85	2.93	1.45	22.60	17.00	4.17
Bromus mollis	76.62	4.05	0.47	9.04	8.46	1.36
Cynosurus cristatus	62.73	4.13	1.32	19.64	9.80	2.38
Dactylis glomerata	70.00	4.06	0.94	13.30	10.11	1.59
Festuca duriascula	69.33	3.70	1.02	12.46	11.83	1.66
Holcus lunatus	69.70	3.49	1.02	11.92	11.94	1.93
Hordeum pratense	58.85	4.59	0.94	20.05	13.03	2.54
Lolium perenne	71.43	3.37	0.91	12.08	10.06	2.15
Annual rye grass	69.00	2.96	0.69	12.89	12.47	1.99
Lolium italicum	75.61	2.45	0.80	14.11	4.82	2.21
Phleum pratense	57.21	4.86	1.50	22.85	11.32	2.26
Poa annua	79.14	2.47	0.71	10.79	6.30	0.59
" pratense	67.14	3.41	0.86	14.15	12.49	1.95
" trivialis	73.60	2.58	0.97	10.54	10.11	2.20
Young grass from water meadow	87.58	3.22	0.81	3.88	3.13	1.38
Same, second mowing	74.53	2.78	0.52	11.17	8.76	2.24
Mean of all analyses	68.76	3.65	0.91	13.65	10.59	2.05

* There is no grass in the entire catalogue of grasses which varies so much in nutritive, according to soil and climate, as the Poa pratense or Kentucky blue grass. The above table is

A similar but less thorough investigation was made by Scheven and Ritthausen. They also gathered all the grasses at the period of their bloom (1855), and analyzed them in the green state.

Botanical name of Grass or Plant.	Water.	Protein.	Fat.	Non-nitrogenous nutritive substances.	Woody fibre.	Ashes.
Agrostis canina	71.4	3.2	0.6	11.6	11.0	2.2
Aira caespitosa	70.3	3.1	1.0	12.8	10.6	2.2
Alopecurus geniculatus	76.9	3.0	1.0	10.1	7.0	2.0
" pratensis	66.8	2.7	0.8	12.1	15.5	2.1
Anthoxanthum odoratum	72.0	2.1	0.8	11.2	12.3	1.6
Avena pubescens	78.1	2.6	0.8	10.9	10.4	2.2
Cynosorus cristatus	72.6	2.1	0.7	10.6	11.7	2.3
Dactylis glomerata	65.1	3.0	0.8	12.6	16.1	2.4
Festuca pratensis	74.8	2.4	0.8	10.2	10.1	1.7
Festuca rubra	73.5	2.4	0.5	9.9	12.1	1.6
Glyceria fluitans	77.7	2.0	0.3	9.5	8.5	2.0
Holcus lanatus	75.1	2.3	0.5	9.5	10.2	2.4
Phalaris arundinacea	68.9	1.9	0.4	12.6	13.5	2.6
Poa pratense	62.0	4.0	1.1	15.4	15.6	1.8
" trivialis	78.0	2.3	0.8	8.4	8.8	1.6
Triticum caninam	70.0	2.8	0.7	11.6	12.7	2.1
Arrhenatherum avenaceum	67.0	3.2	0.4	11.8	15.4	2.1
Avena flavescens	59.5	3.3	0.8	17.2	16.3	2.9
Bromus mollis	66.8	2.8	0.5	12.7	14.5	2.7
Lolium italicum	71.7	2.6	1.0	12.9	9.4	2.3
" perenne	75.2	2.3	0.6	9.5	10.7	1.6
Phleum pratense	68.2	2.0	0.4	13.6	13.9	2.0
Trifolium repens	79.7	4.3	...	9.2	5.1	1.7
" filiformis	75.4	4.2	...	11.2	7.8	1.4
" pratense	76.2	3.4	...	9.7	6.9	1.8
Vicia sepium	77.7	5.2	...	8.3	7.7	1.0
" cracca	75.0	6.0	...	9.0	8.5	1.5
Lathyrus pratensis	76.1	5.1	...	10.3	7.2	1.3
Lotus corniculatus	79.2	2.2	...	10.7	5.3	1.6
" "	76.1	5.2	...	10.6	6.4	1.7
Mean	72.3	3.0	0.7	11.2	10.8	1.9

Thus, it will be seen that the grass of the English meadows appears to be somewhat more nutritious than that of the German meadows.

The average analysis of the tables, by Way and Ritthausen, represents quite accurately the composition of the *green forage of a meadow*. For the dry state, that is, for *meadow hay*, the analyses by other authors is here presented:

copied from an European work. In Kentucky no grass is superior to this as a pasture grass; it is very much in favor in southern Ohio, whilst in northern and northeastern Ohio it is by no means a welcome inhabitant of the pasture-fields.—Klippart.

	Water.	Protein.	Non-nitrogenous substances	Woody fibre.	Ashes.	Authority.
Hay from Cirencester	14.3	9.4	41.1	29.1	5.8	Way.
" " Möckern	14.2	7.4	36.2	34.7	7.5	Ritthausen.
" " "	14.9	9.1	38.8	31.8	5.4	Knopp.
" " " full bloom	16.9	10.7	40.1	27.2	5.0	Wolff.
" " " beginning of bloom	14.3	11.7	43.0	24.0	7.0	"
Aftermath from Möcken, 1853	13.1	10.7	49.7	19.0	7.4	Kayser.
Hay " " "	13.4	9.1	42.7	27.1	7.6	"
Aftermath " " 1854	16.1	10.9	35.7	28.9	6.3	Ritthausen.
" " " "	14.8	12.5	33.1	34.7	4.9	"
Aftermath " Rüdigsdorf	14.5	8.4	38.1	30.7	8.3	Crusius.
Hay " Elsass	13.0	7.2	48.2	24.4	7.6	Boussingault.
Aftermath " "	14.1	12.4	44.0	21.5	8.0	"
Swiss mountain hay	14.3	9.7	41.2	27.4	7.3	Stöckhardt.
" " aftermath	14.3	11.9	40.7	23.3	9.7	"
" valley hay	14.3	12.1	40.6	25.9	7.1	"
" " aftermath	14.3	13.9	39.3	22.9	9.4	"
Hay from Salzmünde, 1860	15.4	9.2	28.9	39.9	7.0	Grouven.
" " Weende, 1858	17.0	14.1	33.9	25.5	9.4	Stohmann.
	14.4	10.4	41.0	27.0	7.2	

Proportion of nutritive matter — 1 : 4.

The amount of fatty matter is between 2.5—3.5 per cent.

A comparison of these average analyses of meadow hay with that of clover hay, exhibits clearly the greater nutritive value of the latter, based on the larger amount of protein contained in it. If both contained an equal amount of indigestible woody fibre, the proportion of their value as forage would be 13·1 to 10·4; but as it is, and the clover hay containing a somewhat larger amount of natural moisture, its value can at best be estimated to be but one-sixth greater than that of meadow hay—that is, 85 to 90 lbs. of good clover hay may be regarded as equivalent to 100 lbs. of good meadow hay.

The remarks on clover hay, in regard to the variations in the amount of its nutritive substances, according to its age, the time of mowing, manuring, &c., *holds equally good with respect to meadow hay.* Yet one peculiar circumstance is connected with the latter, namely, that if it is grazed repeatedly, it does not, like the clover, produce a smaller but a larger crop, and this of a better quality, according to an analysis by Wolff.

As to whether the hay of the first mowing, or that of the second, called aftermath, is more nutritious, the farmers do not agree in their opinions. While in some localities it is generally deemed less valuable than hay, others hold it to be decidedly more nutritious. The chemical analyses of after-

math heretofore made, and especially the following, by Karmrodt, (St. Nicholas, 1858), seem to confirm the opinion of the latter class, since they have shown aftermath to contain a smaller amount of woody fibre, but a much larger amount of protein substances and mineral salts. It is also in accordance with the tenderness of the stems of the meadow plants at the time the aftermath is cut—in fall.

	Water.	Protein.	Hydrate of carbon.	Woody fibre.	Ashes.
English Ray grass, 1st cutting	13·5	7·0	40·8	31·5	7·2
" " 2d "	11·9	14·0	35·0	25·3	13·8
" " 3d "	11·9	10·2	36·9	26·6	14·4
French Ray grass, 1st cutting	11·4	9·3	41·9	29·5	7·9
" " 2d "	11·5	13·1	36·7	28·6	10·0
" " 3d "	11·4	12·2	36·5	28·0	11·9
Italian Ray grass, 1st cutting	10·2	7·9	55·4	19·0	7·5
" " 2d "	10·1	14·0	49·0	17·2	9·7
" " 3d "	10·4	10·9	47·9	18·3	12·5

But when the quality of aftermath is superior to that of hay, it may be attributed to the more or less frequent showers at the time when it is cut, which injure it. While the more hardy hay cut will not be much injured by a shower of rain falling during the curing of it, aftermath may easily be spoiled by it, partly by being soaked, partly by beginning to ferment. Therefore dry meadows will produce a good, but wet ones generally an inferior aftermath.

That dry, warm weather is very desirable for curing hay and aftermath, is shown by the comparative analyses of hay on which several showers had fallen, and of hay which was cured during dry weather. Such analyses were instituted by Isidore Pierre, with good meadow hay wetted several times with cold and warm water, and then pressed.

	In 100 parts of good hay.	Of hay moistened with cold water.	Of hay moistened with warm water.
Dry substance	80·10	19·90	16·57
Protein	8·75	1·76	2·20
Ashes	6·90	3·98	4·04
Phosphate	0·444	0·270	0·270
Natron	1·595	1·200	1·480
Potash	1·253	1·160	1·120

According to this, the amount of valuable substances which may be ex-

tracted by water is so large that the hay loses one-third of its original value, and probably more, if we consider the fact that after soaking it contains no alkaline salts or phosphates, which act a very important part in assimilation. An animal cannot live on such hay exclusively. It will produce disease and general sickness.

We have also an analysis by Stockhardt, of a hay crop raised near Tharand, in 1854, which was left to lie on the meadow 13 days, in alternately wet and dry weather. Another sample from the same meadow was housed very dry within, three days. The following analyses give a comparison of both:

PERCENTAGE COMPOSITION OF THE SUBSTANCE OF HAY FREE OF WATER.

	Good hay.	Hay rained upon.	Loss computed per 100 lbs. hay
Protein substances	7.8	6.5	2.1 per cent.
Sugar	0.71	0.12	0.6 "
Non. Nitrogenous combinations	53.3	49.7	9.8 "
Woody fibre	32.1	36.5	0.0 "
Ashes	6.1	7.2	2.0 "
	100.0	100.02	12.5 "

Ritthausen analyzed a sample of clover hay on which rain had also fallen several times, and which was saved by being dried on clover racks.

	Good clover hay.	Clover hay rained upon.	Loss calculated per 100 lbs hay.
Water	16.00	16.03	.... per cent.
Ashes	8.04	7.50	3.0 "
Woody fibre	25.26	37.24	0.0 "
Protein substance	14.30	15.85	3.8 "
Hydrates of carbon	36.12	23.28	20.6 "
	100.00	100.00	27.4 "

Assuming the most favorable estimate, 146 lbs. of the hay on which rain fell, are worth as much as 100 lbs. well cured and housed.

OTHER FORAGE PLANTS.

There are many other forage plants well worthy of our attention. Mention may be made of green rye, vetches, green oats, corn, lupines, kale and cabbage, &c., which are used as substitutes when clover and grass do not suffice, or cannot be had at the right time. Of what are they composed; what is their value as fodder? These natural questions are answered in the following table:

	Water.	Protein substances	Non-nitrogenous compounds.	Woody fibres.	Ashes.	Authority.
Spergula arvensis (Corn spurry, or Tares).......	89.8	0.9	4.3	3.8	1.2	Emil Wolff.
" out of bloom	78.8	2.9	9.7	5.3	2.4	Lehmann.
" " "	77.9	1.5	...	...	1.4	Eichhorn.
" July 5th	78.8	2.8	7.0	8.6	3 1	Ritthausen.
Polyganum Siboldii, 2 feet high	73..	5.4	13.7	5.8	2.0	Grouven.
Plantago lanceolata (Rile grass, English plantain) 28th May	84.7	2.2	6.6	5.1	1 4	Way.
Poterium Sanguisorba (Pimpernell) 28th May.....	85.5	2.4	7.4	3.4	1.2	"
Sinapis arvensis (Charlock, Wild Mustard).......	85.3	1.9	7.3	4.4	1 0	"
Rumex acetosa (Sorrell)	75.4	1.9	8.1	13.0	1.5	"
Thistles, 1 foot high..........................	88.9	2.7	...	...	...	Pierre.
Nettles, "	84.0	5.3	...	...	...	"
Holcus saccharatus.............................	78.4	3.1	10.9	6.2	1.3	Moser.
Sorghum vulgare	77.3	2.9	11.9	6.7	1.1	"
" "	84.1	1.9	12.3	...	1 7	R. Hoffman.
" saccharatum	70.0	1.7	19.2	8 5	0 6	Grouven.
Artichoke leaf (ripe)..........................	80.0	3.3	10.6	3.4	2.7	Boussingault.
Brassica napus	87.1	3.1	4.6	3.6	1.6	Voelker.
" " May 22d	83.7	3.1	7.5	3.8	2 0	Ritthausen.
Kohlrabi leaves	85.0	2.8	8.9	1.5	1.8	R. Hoffman.
Foderkale 6 lbs...............................	89.5	1.8	4.7	2.7	1.3	Ritthausen.
" 1½	87.7	1.4	7.6	2.1	1.3	Kayser.
" open	91 8	2.1	...	...	1.6	Anderson.
" closed	94.5	0.9	...	...	0.6	"
" outer leaves.......................	86.5	2.8	9.9	0 5	1.3	Hoffman.
" " "	88.8	1.6	6.0	2.1	1.6	Ritthausen.
Seradella, 20th September	85.8	2.6	5.1	5.0	1.4	Hellriegel.
Vicia Sativa, 11th July (vetches)...............	84.0	3.8	4.8	5.1	2.3	Wolff & Jani.
" " 13th June "	82.9	3 0	7.3	4.7	1.1	Way.
" " "	82.2	3.6	...	...	1.5	Voelker.
" " "	84.1	2.7	...	...	1.4	Eichhorn.
Black vetches, 23d May.........................	83.7	4.7	5.8	3.9	1.9	Ritthausen.
" " 12th July..	80.6	3.1	6.1	8.8	1.4	"
Vicia sepium, June 9th.........................	79.9	4.6	7.2	6 2	1.9	Way.
Lentils, end of blooming.......................	77 9	5.0	7.6	8 1	1.3	Ritthausen.
Faba vulgaris)Horse bean)	87.3	2.8	5 4	3.5	1.0	"
Pisum (Field peas) July 9th.................. ..	86.3	3.3	6.0	3.0	1.1	"
" " Aug. 6th.............................	76.1	3.9	16.5	7.7	1.8	"
" (Garden peas), end of bloom...............	85.7	3.2	5.6	4.4	1.1	"
Green Oats, July 11th..........................	84.0	2.3	5.1	7.0	1.6	Wolff & Jani.
" " beginning to head	83 5	3.1	7.6	4.6	1.2	Stockhardt.
" " June 16th..........................	86.5	1.8	...	...	1 6	Ritthausen.
" " in full head............	80.9	1.8	...	...	1.4	Eichhorn.
Rye, June 2d...................................	66.5	3.6	...	...	1.5	Ritthausen.
" May..	79.2	3.1	7.3	8.6	1.8	Voelker.
Indian Corn in bloom, 3½ feet high...............	85.2	1.0	7.4	5 5	0.8	Wolff & Jani.
American Indian Corn before bloom 7½ feet high..	84.3	0.9	8.7	4.9	1.1	Wolff.
Austrian " " just done blooming 8½ft.high	82.1	1.1	10.9	4.7	1.1	"
Baden " " in bloom	85.7	1.1	...	...	1.1	Eichhorn.
Austrian " " After blooming	76.8	1.9	14.4	5.9	1.0	Moser.
Hungarian " " July 15th................	78.0	1.4	15.3	3.0	2.2	Hoffman.
Indian Corn cobs	9.2	1.6	46.5	39.9	2.8	Nyberg.
" " "	8.8	3.0	54 5	30 8	2.9	Moser.

This table shows the great nutritive value of many forage plants. According to analyses, the grain and pulse plants, (green rye, oats, vetches, lupines), cut before the heads are formed, and also the kale plants, (rape, green kale), must, at least, have as much nutritive value as clover, at the beginning of blooming. This conclusion is very evident to every farmer, from his own experience.

It is an interesting fact, established by Ritthausen's analyses of luxurient and stunted young grain plants, namely: that the dark-green, vigorous forage plants possess more nutritive power than the pale and stunted ones. Liberal manuring and cultivation, therefore, will not only increase the quantity, but also improve the quality, of green fodder.

While clover, meadow grasses, oats, green rape, fodder kale, green vetches and lupines, each present a perfect fodder, since they contain, in a certain quantity of digestible matter, destitute of nitrogen, a sufficient amount of protein necessary for animal life and its practical purposes, may be wholly consumed, and require, except in special cases, no admixture of any other feeding material. This can not be said of corn fodder, an accurate analysis of which is also given in the table. According to analyses, corn contains too little nitrogen; it contains, mostly, in 10 parts of non-nitrogenous matter only 1 part of protein, while clover, or vetches, possesses from 2 to 3 parts. When, therefore, a milch cow does quite well on clover alone, she will, if fed on green corn alone, lack plastic nutritive matter, which she can equalize only by consuming an abnormal volume, i.e., by an immediate useless secretion of half the amount of sugar and dextrine contained in corn. But it will be difficult, if not altogether impossible, for a cow to consume twice or thrice as much fodder as she generally eats. If she cannot consume such a quantity, her production of milk and meat, and her strength will soon be reduced to its minimum, if she feeds on corn alone. At all events, the feeding on corn alone is wasteful.

This may be avoided, when the daily rations of the animals consist only one-half of corn, and the other half of good green clover or vetch fodder. If this is not to be had, every full adult animal requires, daily, a peck (German peck) of bean meal or pulverized oil cake, for a dry admixture. Under these conditions, corn becomes a most excellent fodder for milch cows.

For raising corn, the early varieties are commended by many, such as the Redish and Upper Austrian corn. They are said to yield better crops than the late American varieties, if the former are cut and fed to animals two and a half months after planting, or before the middle of August. But I cannot accede to this opinion, for a comparative analysis which I

instituted this year with two samples of corn, grown side by side of each other, on the same field, at Salzmuende, and planted on the same day, showed the following results:

GREEN CORN, CUT AFTER BLOOMING, ON THE 10TH OF SEPTEMBER, 1862, AND THE WHOLE PLANT ANALYZED.

	Amer Corn.	Hungar. Corn.
Water	87.14	86.36
Fat and wax	0.41	0.81
Protein substances	1.45	0.96
Sugar	0.55	1.01
Starch	2.53	2.28
Woody fibre	2.77	2.97
Organic acids and unknown non-nitrogenous combinations	3.81	4.37
Ashes	1.34	1.24
	100.00	100.00
Proportion of nutritive matter	1:5.3	1:9.6

Thus the economical value of both samples was nearly equal, and the value of the whole crop, therefore, proportionate to its amount.

But the parcel of ground planted in American corn yielded at least one-third more of green fodder than the parcel of the same area, planted in Hungarian corn.

STRAW AND CHAFF OF RIPE GRAIN.

Although these productions are far less nutritious than the forage plants already described, yet they are of some importance, since there still are many farms where cattle do not receive any other food during the winter but straw and chaff, i. e., where the farmer is satisfied if it brings them barely alive through the winter.

It is true, cattle may be kept alive on straw and a few turnips, but that is all; for it is out of the question for the animal to produce any thing, or to be used for any purpose. This may be proved best by a chemical-physiological examination of such forage substances, and is proposed here to be submitted for an examination for the benefit of those cattle raisers who, still adhering to the ancient custom, will not acknowledge that straw occupies a low place among the forage substances.

	Water.	Protein substances.	Nitrogenous combinations.	Woody fibre.	Ashes.	Authority.
Wheat straw, heads, 6 per cent	19·9	3·9	....	....	....	Pierre.
" leaves and leaf sheaths, 26 per cent.	17·1	3·0	....	....	....	Pierre,
" upper half of stalk, 6 per cent	14·6	2·4	....	....	....	Pierre.
" lower half of stalk, 62 per cent	15·6	1·5	....	....	....	Pierre.
Winter wheat straw	14·3	4·0	29·8	45·0	6·9	Wolff Dietlen.
"	12·0	1·9	32·5	48·4	5·3	Ritthausen.
"	13·3	1·5	....	....	6·8	Anderson.
"	26·0	1·9	38·1	28·9	5·1	Boussingault.
"	13·5	3·2	33·1	44·3	5·9	Stohmann,
Summer wheat straw	14·3	1·5	26·7	52 6	4·9	Wolff Dietlen.
Speltz	14·3	2·2	27·4	50·2	5·9	Wolff Dietlen.
Rye straw	14·3	2·1	25·6	54·9	3·1	Wolff Dietlen.
"	18·6	1·5	44·5	32·4	3·0	Boussingault.
"	17·0	4·1	35·4	39·0	4·5	Grouven.
Barley straw	14·3	1·9	21·7	54·0	8·1	Wolff Dietlen.
"	14·3	2·6	23·0	52·3	7·8	Wolff Dietlen.
"	13·5	3·7	33·0	42·6	6·5	Ritthausen.
"	11·7	2·9	40·0	46·3	6·1	Knop.
" mixed with clover	15·6	6·2	30 0	41·1	7·0	Ritthausen.
" without clover	12·0	1·9	32·5	48·4	5·3	Ritthausen.
" " "	14·2	1·9	45·5	34·4	4·0	Boussingault.
Oat straw, mixed with clover	14·3	7·7	24·9	48·3	4·8	Wolff Dietlen.
" without "	14·3	2·6	27·5	50·2	5·4	Wolff Dietlen.
" " "	21·2	1·3	27·0	45·2	5·3	Crusius.
" " "	12·0	3·0	33·1	47·4	4·5	Horsfall.
" " "	21·0	1·9	43·5	30·0	3·6	Boussingault.
" " "	12·1	1·5	....	....	4·8	Anderson.
" " "	16·0	2·8	27·1	48·2	5·9	Grouven.
" " "	12·6	3·3	42·1	36·1	5·9	Henneberg.
Mean of all analyses	15·4	2·6	31·5	45·0	5·5	
Proportion of nutritive matter, 1:1.2						
Winter wheat	17·7	4·8	....	....	....	Pierre.
"	14·3	4·9	31·2	37·8	11·8	Wolff Dietlen.
"	8·6	7·4	51·5	29·3	3·3	Crusius.
"	11·5	5·2	53·9	20·3	9·3	Boussingault.
Summer wheat	14·3	3·3	29·4	39·7	13·3	Wolff Dietlen.
Speltz	14·3	2·9	33·0	41·4	8·4	Wolff Dietlen.
Rye	14·3	3·7	28·0	46·6	7·4	Wolff Dietlen.
Barley	14·3	3·5	39·8	31·3	11·1	Wolff Dietlen.
"	13·9	2·7	40·5	29·7	13·1	Nitthausen.
Barley speltz	12·7	4·6	55·5	22·8	4·4	Grouven.
Oats	14·3	4·0	28·0	34·9	18 8	Wolff Dietlen.
Mean	13·7	4·1	38·1	34·5	9·6	
Proportion of nutritive matter, 1:9.3						

Considerable differences are observed in the results of the various analyses of straw, and also in the nutritive effect. This may partly be explained:

1st. By the different nature of the straw, in respect to its kind and variety.

2d. By the larger or smaller amount of grains remaining in the ears in threshing.

3d. By the more or less perfect separation of the more nutritious chaff and blades from the ears in threshing.

4th. By the varying state of maturity of the straw; the riper it is, and the longer it stands before it is mown, the less nutritious it will be.

5th. By the fact that the straw of summer crops is one-fourth more nutritious and valuable than that of winter crops.

6th. By the condition of the weather; whether it is housed dry or moist.

7th. By the condition of the land on which it grew: a well manured, powerful field produces a more nutritious straw.

8th. By the amount and nature of the grasses intermixed with it and grown among the crop. Straw intermixed with a large amount of young clover, may prove twice as nutritious as otherwise.

As to the kind of straw, that of summer barley and oats is deemed the most valuable for feeding purposes, which is also in accordance with the analyses. The next is that of summer wheat and winter barley; that of winter wheat is inferior, and rye straw has the least value of all. But this rule is sometimes subject to exceptions in special cases: thus it frequently happens that rye straw is better than oat straw of the same season, and contains more protein substances.

Chaff contains less woody fibre, and decidedly more protein substances and mineral salts. The proportion of the nutritive substances in it is, therefore, as 1 to 9, which makes it a tolerable fodder for cattle. In an economical point of view, one part of hay is equal to two parts of chaff, and to three parts of straw.

Straw and chaff contain but little *fatty matter*, on an average hardly more than one per cent., except oat straw, which has three per cent. of fatty substances.

What nutritive value has straw in general? If we were to answer this question according to these analyses, and if we would base our calculation upon the 2·6 per cent. of proteïn and 31·5 per cent. of soluble non-nitrogenous combinations in straw, it would be very simple, but the result would not be reliable, for it would be too favorable in comparison with the experiences of farmers, and it would not agree with the more recent investigations of the digestibility and the nutritive value of the various constituents of straw.

We know that a large portion of this 31·5 per cent. of soluble non-

nitrogenous combinations has no nutritive value at all, and that a no less considerable portion of 45 per cent. of woody fibre, which were considered insoluble and indigestible, according to our former analytical methods, are actually dissolved by the digestive juices of cattle and sheep.

According to investigations as yet very limited, the amount of *worthless* non-nitrogenous constituents of straw varies between ⅓ to ½ of three constituents proved soluble by analysis; it, therefore, amounts to 10 to 15 per cent. of the weight of straw, and only 15 to 20 per cent. remain for the category of sugar, being of nutritive value.

As to whether the 2·6 per cent. of nitrogenous substances found by summary analysis must be reduced at the same rate, is not stated as yet; but it is believed that those nitrogenous substances calculated by the amount of nitrogen approximate more the constitution of the pure nutritive proteïn matter, and are, at most, to ½ of their amount intermixed with worthless nitrates, ammoniacal salts, alkalies, chlorophyll, and wholly indigestible particles of proteïn. In any other fodder, except straw, this worthless portion must be of another proportion, because the amount of heterogenous nitrogenous substances is different in every kind of fodder. Besides, any fodder containing much woody fibre produces excrements containing different amounts of proteïn matter, which could not be the case, if the nitrogenous substances in every kind of fodder were digestible in an equal degree. Yet we have no positive knowledge of their proportions, and it will require yet much labor and investigation before we can determine what proportion of the nitrogen contained in every one of the principal kinds of fodder has no nutritive effect.

As to the analytical amount of woody fibre, the recently established fact, that a portion of it is digestible is far from being satisfactory. We must also know the nature of the combinations originating from the digestion of the woody fibre, and their nutritive value. It is believed by some that the substances resulting therefrom probably are of a saccharine nature; but they may perhaps be substances similar to those which are found in the analytical column of the soluble non-nitrogenous combinations, and have, as before stated, no nutritive value at all.

By these remarks every one must see how little light the above analyses of straw give us in respect to the actual nutritive value of straw; nay, it may be added that the analyses of no other fodder have furnished so unsatisfactory results as those of straw and similar productions containing much woody fibre. Accordingly these analyses of straw have not determined anything positively but that, in general, straw is a fodder containing but a small amount of proteïn, and will not satisfy the wants of proteïn in any productive animal fed with it exclusively. A milch cow, for instance,

in order to obtain her daily requisite amount of 2½ lbs. of proteïn, would have to consume about 100 lbs. of straw, which is impossible for her to do; and even if she could do it, this method of feeding would be objectionable economically, for it would be a useless waste of non-nitrogenous nutritive matter because no animal will, for any length of time, assimilate 12 parts, but 7 to 8 parts only of the latter to every 1 part of proteïn. The remaining 4 parts of so-called hydrates of carbon may be made useful only, if a food rich in proteïn (oil-cakes, pulse, bran, clover hay, &c.) is mixed to straw.

According to these views of the nutritive value of any substance, the physiological value of straw is wholly dependent upon other incidental substances constituting the ration of an animal.

MICROSCOPIC RESEARCHES:

Resulting in the discovery of what appears to be the Cause of the so-called Blight in Apple, Pear and Quince Trees; and the Decay in their Fruit, &c.

BY J. H. SALISBURY, M.D., AND C. B. SALISBURY.

Commencement and Progress.—During the summer of 1862 the blight began to affect the apple, pear and quince trees in Central Ohio, about the 12th of June. It made its appearance suddenly, after warm moist weather. Its invasion and progress was identical with the attack of blight which was so destructive to apple, pear and quince trees in 1847 and '48, throughout the Northern and Eastern States. At different elevations, the trees were affected in different degrees. Generally on, and, for a short distance, above the third terrace from the stream bottoms—which corresponds with the line of suspended stationary vapors and fogs—the trees were much more affected than at higher or lower levels.* Some trees in an orchard would be affected much more than others adjacent on the same level. Often the more thrifty trees and most vigorous sprouts, would be the ones the most invaded. Sometimes twigs and limbs would commence dying at their extremities, and this death would gradually advance towards the base of the limb, always advancing faster in the layer of new soft wood and bark (cambium) than in the more solid heart wood. At other times the death would commence in the middle of a limb—often several feet from its extremity—killing the new wood and bark first, and gradually advance from the point of starting, up and down the limb, leaving the heart wood sufficiently alive to communicate, for weeks, sap enough

* In our examination of rich peaty, wet low grounds and bogs, with the view of determining the character of the malarious matters produced by them and elevated in the fogs and night vapors rising therefrom, we found the fungus, which is the cause of the apple, pear and quince blight, &c., growing luxuriantly on and in the peculiar, palmelloid, algoid growths, that are so prolific upon the broken-up sod and surface of rich bogs. (These palmelloid growths, with their parasitic fungus, will be fully described in a paper, which will soon be ready, on the Cause of Intermittent Fevers, &c.) The occurrence of the apple, pear and quince-tree blight-fungus, so abundantly in positions where their spores are liable to be elevated in every rising fog or night vapor, and the further fact, that trees are more affected with blight along the line of elevation described by the stationary night and morning vapors, points strongly to the boggy grounds as one source of this destructive fungus.

past the diseased and dead surface rim, to support the vitality of the extremity. In other instances, a surface-patch, merely, on the side of the limb, would die. This disease progressed till about the first of August, when its advance seemed to be checked by the tissues of the young wood becoming too firm for the further invasion of the fungus.

In our office yard were several apple trees affected with the blight. We selected several limbs for observation, which began to die near where the spring's growth commenced. These limbs were first affected between the 12th and 15th of June. Death gradually advanced both towards the base and extremities of the limbs, till on July 14th the limbs were all dead to their extremities. July 15th, cut off the limbs for dissection and microscopic examination. Found the entire limbs, through and through, at the point where the blight commenced, filled with the mycelium of a peculiar fungus. The threads wound around in every direction among the woody cells; and where there were intercellular spaces, these were filled with the moniliform threads, fig. 3, Lignograph A.* In passing up or down the limbs, the same appearance was presented, save that the fungus was more and more confined to the new layer of wood as you departed from the point of attack. For several inches beyond (in the tender, rapidly growing twigs), where the limbs were not actually dead, dead lines, the size of a knitting-kneedle, extended in the soft viscid, gelatinous matter (cambium), which was to form the new annual layers of wood and bark. Along these dead lines could be traced the moniliform threads, making their way among the cells.

Fig. 1, Lignograph B, represents a portion of a transverse section of the limb of an apple tree, affected with blight. This section was taken about ½ inch from the live portion. It will be seen that here the young plants are making rapid headway among the cells. In the center of this slice is an intercellular space, filled with short moniliform threads.

Figs. 3 and 5, Lignograph C, represents a portion of the moniliform filaments in a part of the limb that had been dead since June 15. This portion of the branch was much shrunken; and in the intercellular spaces and between the cells, occur these moniliform (mycelium) threads, winding about and knit together in various ways.

Fig. 6, Lignograph D, a longitudinal section of wood immediately beneath the bark; showing short moniliform threads in the interstices between the vessels.

Figs. 2, 4 and 7 (Lignographs B, C and D), fungoid filaments found in a single intercellular space of the wood of a dead twig. Fig. 4 represents the same species as figs. 3, 5 and 6. Figs. 2 and 7 represent fungi that we have found only in portions of twigs that have been some three weeks or

* The Lignographs or engravings will be found on pages 473 to 479.

more dead. They are probably the consequence instead of the cause of the disease—being developed only from dead and decaying tissues. Fig. 1 is very peculiar, from the fact, that each cell sends off lateral hairs, giving it a barbed appearance. This fungus occurs in tufts in the interstices of the wood that has been dead for three or four weeks, and is accompanied, so far as we have seen, with the fungus represented by fig 2, Lignograph B.

In the blighted quince twigs are found the same moniliform threads seen at figs. 3, 4, 5 and 6, and a fungus that resembles fig. 2, in the apple. The blight produced most of its ravages, in its attacks on the trees, from the 12th of June to the 15th of July. From the 15th of July to the 1st of August, its progress was slight. From the 1st of August forward, the trees improved. The fruit was attacked first when about the size of a hazel-nut, destroying much of it. It was again attacked when about half grown; and, finally, again as the fruit was maturing, destroying a large portion of the crop.

Description of the Apple, Pear and Quince Blight Fungus.

(*Sphaerotheca Pyrus, Salisb.*)

It would seem highly probable to those who had not carefully explored the field, that the fungus (*S. Pyrus*) which causes the blight in the apple, pear and quince trees, &c., might with propriety be arranged under two different and well marked species. A careful investigation of the subject, however, affords satisfactory evidence that these variations are only the different stages in the development of the same species, modified perhaps somewhat by the varying states of the bodies on which it grows, and the varying meteorological conditions to which it is subject at different periods of the season. As long as the tissues, in and on which it grows, continue soft and tender, and filled with nutritive juices, it appears to have a tendency to be developed in the form and to produce the kind of fertile threads seen at figs. 13 and 20, Lignographs E and F, and figs. 35, 38, 39 and 48, Lignographs G, H and I. These threads emanate usually from discs or perithecia, like those seen at figs. 29, 34, 45, 46 and 47, Lignographs K, L, M, N, O. This is the form which is presented when the plant is developed upon the rich, juicy, decaying fruits. After the fruit is somewhat advanced in decay, or becomes dry, and in the twigs and leaves after their cambium and parenchyma begin to harden, and the nutritive juices are diminished, the filaments pass to another stage of development, seen at figs. 24, 25, 40, 41, 42 and 43, Lignographs P, G, Q. The fertile threads and the lines and masses of spores, in size, shape and arrangment, assume quite a different appearance from those produced when the tissues

are succulent, soft, and abundantly supplied with nutritive materials. It is thus seen to have two different and well marked modes of fruiting, and several different forms of sporidia. (Figs. 24, 40, 41, 43 and 48 to 58, Lignographs P. Q, N, I, O, R.)

This plant is strictly a parisitic fungus, that affects organic tissues; and appears to be poisonous both to plants and animals. Its sporidia are often inhaled in large quantities during its period of rapid reproductive development; and frequently the expectorated sporidia are found vegetating. That the inhaled sporidia produce more or less irritation of the pulmonary mucous membrane is quite probable, from the fact that in walking over rich boggy grounds, where the surface is more or less broken, exposing the fresh peaty soil, especially during the months of June, July, August and September; or in passing, in the morning or evening, over positions where hang the vapors from boggy localities, the fauces, throat, and pulmonary membrane becomes dry, feverish and congested, which lasts often for hours after removal from continued contact with the exciting cause; and from the further fact that the expectorated mucus, after leaving such localities, is found filled with the sporidia of this fungus.

This fungus belongs to the group Ascomycetes, to the order Prisporiacei, and the genus Sphærotheca; for a description of which, see the paper on the Cause of the Blister and Curl in Peach Leaves, &c. This species resembles, and may be found to belong to the peach fungus (*S. Persica*); but as there appears, at this stage of the investigation, to be specific differences, and not finding it within our range of reading described, we name it after the generic name of the family of plants it so much affects—the *S. Pyrus.*

This fungus resembles, somewhat, species arranged under the genera *Sporochisma* and *Bloxamia*, which belong to the group *Coniomycetes*, and the order *Phragmotrichium.* There are, however, many marked peculiarities about this plant that separate it from those of the *Coniomycetous*, and unite it with those of the *Ascomycetous* group.

One species of *Sporochisma*, the *S. Spilocaea*, affects apples, forming the black specks on their surface, which are occasionally so numerous as to make them unsalable. In producing blight, the sporidia begin to develop in the soft, viscid layer of cambium, and follows the vessels up and down from the point of starting. As fast as the mycelium progresses, death ensues. Figs. 14 and 20, Lignographs E and F, and figs. 24, 25, 29, 34, 35, 42, 43, 45, 46 and 47, Lignographs P, G, K, L, Q, M, O and N, represent the usual forms presented by this fungus at different stages. The fertile threads and lines and masses of spores seen at figs. 24, 25, 40, 43, &c., Lignographs, P, G, &c., appear on the dead leaves and twigs, like a

fine dark brown or black carbonized dust. So imperceptible is it that it is with difficulty discovered to be a plant at all. Wherever the mycelium and fertile threads appear, the tissues die, and become carbonized and black; especially is this the case with leaves. Figs. 29 and 30, Lignograph K, represent an early stage in the development of the fertile threads from the discs or perithecia.

The various forms and groupings of sporidia are represented at figs. 20 and 21, Lignograph F, and figs. 24, 25, 26, 27, 28, 31, 32, 40, 41, 42, 43, and from 48 to 58, Lignographs P, G, K, Q, J, N. O and R.

Fig. 32 represents a paraphysis bearing upon its summit spores.

Fig. 24 *b*, represent young asci.

Figs. 38 and 39 represent portions of the fertile filaments of the plant, seen at fig. 24.

Fig. 11, Lignograph E, represents the mycelium of the fungus, as it appears in the cambium of the limbs which it attacks. Decay follows close on the advance of the mycelium, which runs along in lines in the direction of the new woody fibers.

Figs. 8, 9, 10, 12, 13, 14, Lignographs S and E, and fig. 42 *t*, Lignograph Q, represent most of the forms of fertile threads on the branches. Occasionally fertile moniliform lines of spores, like those seen at figs. 8 and 14, Lignographs S and E, may be seen on them and the tender leaves in June and July, during the rapid deposit of woody matter and the abundant supply of nutritive juices.

Fig. 8, Lignograph S, and figs. 40 and 41, and *k*, *l* and *e*, fig. 42, Lignograph E, represent masses and lines of sporidia, which are developed either on or in the course of the fertile threads. The mass, fig. 41, is vegetating.

Fig. 42 represents the mycelium and fertile threads of the *S. Pyrus*, from a branch of a quince tree; and figs. 40, 41, 43, and *t*, fig. 42, the fertile threads running into lines and masses of sporidia. Figs. 45, 46 and 47, Lignographs M, N and O, represent the appearance of the discs or Perithecia, under the cuticle, from which emanate the fertile threads, and the various forms of sporidia, figs. 48, 49, 50, 51, 52, 55 and 58, Lignographs J, N and R. The other forms and arrangements of spores are seen at figs. 53, 54, 56 and 57. The spores, 40, 41 and 43, and *d*, *e*, *g*, *h*, *i*, *k* and *l*, fig. 42, are produced on the fertile threads, above the surface, and which are believed to be connected directly with the mycelium, without the intermediate Perithaceia, figs. 45, 46 and 47. In the Perithaceia, the formation of fertile threads and asci and sporidia, commences at the center and most depressed portion, as seen at fig. 46, and gradually fill up and occupy the whole concavity with fertile threads. In the perithecium (fig. 47) no fertile threads are yet seen protruding above the lid. Fig. 42 *f*, are elongated, oval sporidia; *m*, *m*, *m*, fig. 42, are a class of yellowish, quite

refractive bodies, that contain smaller cells of the same nature. Fig. 42 *s*, are highly refractive, transparent, spherical spores, form a beautiful species of pencillium, that is, the yeast plant of the decaying quince fruit. Fig. 42, *t*, fertile threads attached to the mycelium.

The mycelium, during the early stages of decay, is transparent; in more advanced stages it becomes a dirty, greenish brown, and in still more advanced conditions a brownish black, at which stage the decayed flesh of the fruit becomes either dark brown or black. Very often there can be no connection traced between the masses and lines of spores, figs. 40, 41, 43, and *d*, *e*, *g*, *k*; *i* and *l*, fig. 42, and the fertile threads or mycelium. They are often found attached to the hairs of the fruit branches.

The sporidia begin to vegetate in the cambium (new wood and bark) of the more recent, tender, and smaller limbs early in June. This takes place often some distance from the extremity, but more often at or near the extremity. At first a dead patch on the side of the limb, of an oblong shape, or a dead rim round the limb is noticed. On making a section through the limb, early in the disease, the newly formed layers of wood and bark only are found dead; while the heart wood remains alive, frequently for several weeks, through which the nutrient juices pass to, and preserve vitality in the extremity of the branch. At this stage there are seldom found any fertile or sterile threads upon the surface. If, however, the outside bark be removed, dead lines will be seen running along in the direction of the fibers, in the cambium; and in these dead lines and patches, and even in advance of them, will be found the minute filaments of the mycelium seen at fig. 11, winding about among the cells.

This fungus attacks the quince, pear and apple fruit at all stages of its growth. In the former, the first attack is when it is about the size of a *hazel-nut*. Much of the fruit decays when it is from one-third to one-half grown, and still more as the fruit is maturing. When the fungus once begins to develop in the mature fruit, it grows luxuriantly, and decay follows close the advance of the mycelium. In the early stages of development, and also when excluded from the air, the sporidia and fertile threads are white and transparent. As they advance toward maturity, they become darker and darker; till finally, in mass, by reflected light, they appear a dark brownish black. Singly, and by transmitted light, they appear a dark yellowish brown. The fertile threads grow by pullulation. The spores 40, 41, 43 and *k*, *l* and *d*, fig. 42, are produced on the fertile threads that rise above the surface, whilst the spores, 48, 49, 50, 51, 52, 55, and 58, are produced from fertile threads arising from discs or perithaecia.

Fig. 20, Lignograph F., represents one form of the fertile threads of the fungus that attacks the apple-fruit. It resembles that which attacks

peach leaves and the peach fruit. Wherever it attacks the apple, it produces decay as fast as the mycelium advances. It is not usual for the fertile threads to appear. Generally, the plants in the apple-fruit consist only of mycelia; especially while the apple hangs on the tree. The apple-fruit, like the peach, is attacked and injured most by this fungus, just previous, and at the period of ripening. In 1862, it destroyed in Ohio a large portion of the apple crop, many of them decaying and falling before they were fully matured. Fig. 23, Lign. B, represents a body which often occurs in the flesh of the fruit.

Fig. 22, Lignograph B, represents the mycelium, when it occurs in the fruit. It is very rugged and luxuriant in appearance, and extends through all parts of the fruit affected. The decay advances as rapidly as progresses this mycelium. Where the trees are affected with blight, the fruit on such trees is sure to be affected, more or less, with this fungus; either when green, or just before and at its maturity. The apple-fruit is liable to be attacked with this fungus at all stages of its development. Often from a half to three-quarters of the crop, and sometimes a greater proportion, is destroyed during the month of June and the early part of July. When the fruit survives this period, it seldom decays much till it is approaching maturity, when it again is attacked and often decays rapidly and prematurely, in large quantities. The next period of attack is after it is picked and laid away for fall and winter use. At this period, the fungus is particularly luxuriant and destructive. The appearance of the mycelium in the fruit is seen in fig. 22, Lign. B. It is peculiarly rugged and rapid in growth, decay keeping pace with its advance.

Figs. 20, 12, 14, Lign. E and F, and figs. 40, 41 and 43, Lign. Q, represent the appearance of the fertile moniliform, threads and chains of sporidia, containing in their course masses of spores. The moniliform threads, figs. 14 and 20, are the most abundant during the early and rapid decay of the fruit. In more advanced stages of decay, the rigid fertile threads and masses of spores are developed. Sometimes the fertile moniliform chains of spores are simple, and at others, compound. The simple and compound threads arise from the same source.

A beautiful species of Pencillium is developed abundantly in decaying apples (and other fruit). This fungus is the yeast plant of decaying apples. It produces the numerous small spherical and highly transparent spores that are scattered over the field; in examining the apple fungus, fig. 14, &c, this species of Pencillium is white and transparent, producing beautiful, clear, highly refractive spherical spores, fig. 15, Lign. E. The productive heads are terminal, and often are beautifully triply trichotamous, (fig. 18, Lign. T); that is, the fertile thread is first symmetrically

divided into three equal branches; then each of these three branches is again divided into three branchlets, and each of these branchlets subdivided into three pedicles—upon the extremity of each is developed a beautiful monilliform line of highly transparent spherical spores. Figs. 16 and 17, Lign. T, are imperfect heads of the same species. This fungus, while it probably hastens decay, after once being started by the blight fungus, (S. Pyrus), does not, of itself, start the rot, unless the fruit has arrived at that period of maturity when fermentation and decay becomes a natural process, or the fruit is so unnaturally situated—as regards the conditions of moisture and temperature—that this yeast Pencillium is excited to vegetate and act as a ferment.

This species of fungus is morally, then, rather the consequence than the cause of decay in fruit.

Fig. 37, Lign. U, represents vegetating sporidia. These sporidia were placed into a watch glass, in a solution of sugar, at 10 A. M., and set aside at a temperature of 70 deg. F. At 4 P. M., six hours after, they presented the appearance seen at 37. These sporidia were taken from the apple leaf. Fig. 36, Lign. U, represents the sporidia of the plant—Fig. 35, Lign. G, vegetating. These vegetating filaments are less marked and not as rigid in appearance as the filaments of the plants, 24 and 25. Fig. 59, Lign. H, represents zoospores organizing cylindrical cells. The sporidia and fertile threads of the plants 24, 25 and 35, were placed in a solution of sugar, August 25th. August 27th, numerous zoosporoid cells were moving about actively. Fig. 59, *a*, *b*, *c*, *d*, *e*, and *f*, Lig. H, represent their different shapes. Celia were noticed on the larger ones. The zoospore *a*, was carefully watched. In it, near the posterior end, are two organized cylindrical cells. These cells, in a short time, were being voided, as seen at *b*. During the voiding, the zoospore became nearly spherical. *c* represents these cells voided. *d* represents the zoospore after voiding the cells. While it was voiding the cells, it had a slow, pulsating, revolving motion. After they were voided, it resumed its former zigzag, progressive, rotary movement.

The pear trees and pear fruit are affected in the same manner, and by the same cause as the apple and quince. Persimmon fruit is invaded, also, by the *Spyaerotheca Pyrus*, but it produces in them no signs of decay. The reason of this is, probably, the large amount of sugar and tannic and gallic acids they contain, and the small percentage of water.

MUCER-NIGRICOUS-SALISB.

This is a peculiar mould, of large size, which sometimes produces decay in pear-fruit. It is more apt to attack the early juicy pears, than those

which ripen later. The fertile threads on the surface of the pear occur in masses; are grizzly black by reflected light, and have a curled appearance and a crispy feel like the hair of the negro; hence its specific name. It belongs to the group *Physomycetes*, the order *mucorini*, and the genus mucor. Not finding it anywhere described, we have named it from the appearance of the aerial threads.

The pears affected with rot caused by this fungus are filled, in the decaying part, with mycelium, fig. 61, Lign. V. The mycelium is luxuriant, and the rot keeps pace with its progress, which is often so rapid that a whole pear will decay in from 48 to 72 hours. The fertile threads do not appear often on the surface till after the fruit is entirely decayed; making it appear as if it were the consequence, instead of the cause of the decay. The microscope, however, discovers the mycelium in advance of the decay.

Fig. 60, Lign. W, represents the fertile threads of the *mucor nigricous*, in various stages of development. *a* is a mature sporangium. The spores are within a thin, transparent, membranous sack, until mature, when they burst forth upon the surface. *b* are immature sporangia. The spores show faintly through the sporangic membranes. They are inclosed in large sacs, which are themselves inclosed in the sporangic envelope. *c*, fig. 64, Lign. V, represents the shape of the majority of the spores, which are spherical. *d* represents the shape of those spores that are double and those that are oval. These are generally larger than the spherical spores. *e*, fig. 64, represents germinating spores. It is quite seldom that the fertile threads of this fungus appear on the surface of the fruit. When they do, they are very thrifty and rank in growth, and harsh, crisp and curled, and grizzly black, like the hair of a negro that has begun to turn gray. They often rise half an inch above the surface and appear like a curled compact mass of grizzly black hair.

The sporangia are large, bladder-shaped sacks (fig. 60, *f* and *b*, Lign 3,) terminating the fertile threads. *f* is the columella and *m* the vesicle that becomes filled with spores. They are filled with a sort of protoplasm at first, contained in sacks. This endochrome is formed into spores. These secondary sacks disappear, and the spores, when mature, make their way to the surface, as seen at *a*, fig. 60. The bladder-like sporangia, if not kept moist, in a few minutes after they are separated from the mycelium, or fertile threads, shrink and collapse. The spores also shrink and shrivel if not kept moist. If, after they have shrunk and shriveled, moisture be applied, they immediately assume their former plumpness In this respect they differ from most fungi and their spores. This fungus produces a rapid wet rot. The pears decayed by this mould will hardly hold together.

Aug. 23, 9 A. M—Placed some mature spores of the *m. nigricous* in a

solution of sugar, between two watch glasses, and exposed to light, at a temperature of 70° F. At three P. M., six hours after, many of the spores had vegetated and presented the appearance seen at fig. 62, *a*, Lign. V. Others presented no signs of vegetating. It will be seen, by referring to the figure, that three spores have been joined together by their filaments. This system of anostomosis always occurs where spores are arranged near each other in the matrix.

Aug. 24, 6 A. M—21 hours after being placed in the saccharine solution, many of the spores had vegetated so as to present the appearance seen at figs. 63 and 65, Ligns. X and V. The growth was luxuriant and rugged. This fungus only attacks the mature, mellow pear.

PROPHYLACTICS.

In combatting the invasion of this fungus, we necessarily have to rely more upon "*preventives*" than "*curatives*." The preventives must be bodies which have an influence in controling mucedinous growth, and still are not injurious to the trees. Among these—that can be cheaply and readily obtained, and which, while they retard the growth of the fungus, act as manures to the trees—may be placed Sulphur, Sulphurous Acid, Sulphites, and Sulphuric Acid. These bodies are all, more or less, destructive to fungus development, and have the power of stopping fermentation. The wine-grower controls the vegetation of *yeast plants* (fermentation) by burning sulphur in his casks. The sugar manufacturer checks mucedinous cellular development in the juice of the cane, (preventing the formation of glucose, which would interfere with granulation) by adding a few drops of Sulphuric or Sulphurous Acid, or a small quantity of some soluble Sulphite to the freshly expressed juice.

The sporidia are mostly in the circulating juices of the tree, and in their passage become fixed, and vegetate in the tender developing leaf tissues, which afford them a matrix, with abundant nutrient supplies. The preventives should therefore be applied so as to enter the sap of the tree in its early circulation in spring, as soon as the flower and leaf-buds begin to swell or open, that they may reach the sporidia before they begin to vegetate. To this end, I would suggest the digging away of the sod or surface earth from around the trees, and the application of a compost, containing either Sulphur, Sulphurous Acid, Sulphites, or Sulphuric Acid. The refuse gas lime from the purifying vats of gas establishments, either alone or mixed with coal ashes, cinders from foundries, iron furnaces and blacksmith shops; or the pitch from coal oil refineries, boiled down to asphalt and pulverized, furnish cheap and appropriate materials for the purpose, containing the desired bodies for checking mucedinous growths. These

should be mixed with good soil (half and half) before being applied. These bodies all contain valuable nourishment for the trees. They will also guard against many depredations from insects. Care should be taken not to use the gas lime too liberally.

RESEARCHES,

Resulting in the discovery of the cause of the so-called "Blister and Curl" in the Leaves of Peach Trees, and the decay in the Peach Fruit; with some observations on the Development of the Peach Fungus (Sphaerotheca Persica).

BY J. H. SALISBURY, M. D., AND C. B. SALISBURY.

For some years, in this country, the disease which produces the "*Blister and Curl*" in the peach leaf, and decay in the peach fruit, has widely prevailed, and produced extensive ravages. It often has destroyed entire orchards of peach trees, by killing the leaves in the early part of the season. Young and vigorous trees are generally able to live through it, yet not without being materially injured. The disease attacks the young leaves as fast as they make their appearance. It produces its greatest ravages—in this climate generally—from the 10th of May to the 15th of June. By the 15th of June the new sprouts have nearly completed their growth, and but few new leaves subsequently make their appearance. The disease, hence, has but little chance to spread further than it already has gone—it being one confined in its destructive ravages to young and tender leaves and new shoots. The leaves, by the 15th of June, having become quite firm in texture, those which are not killed or too much enfeebled and involved in the disease, begin to revive, and the trees, if not too greatly injured, begin to assume, from this date, a more and more healthy appearance.

Various have been the theories respecting the cause of this disease. The one most generally received among fruit-growers is that which attributes it to spring frosts.

About the middle of May, 1862, my attention was particularly called to the careful study of the disease. On dissecting the leaves, and subjecting them to a careful microscopic examination, I found the parenchyma filled with several layers of fine myceliated threads, crossing and anastomosing with each other in various ways, forming a complete net-work among the leaf-cells (Lign. Y, Fig. 5.) On examining carefully the surface of the

leaves under the microscope, small pearl-white moniliform threads were found, making their appearance externally and proceeding from the interlacing and anastomosing filaments within the leaves.

The leaves of many different trees in different orchards were examined, and wherever a leaf was affected with the blister and curl, or either, much or little, there was found the mesh of interlacing and anastomosing filaments (fig. 5) in its parenchyma; and often, on its surface, could be discovered the moniliform fertile threads (Lign. Y, fig. 1.) In the healthy leaves there appeared no such growth. Under and near the peach trees were noticed the leaves of the Ohio Blue Grass (Poa pratense), generally white with a similar growth to that on the leaves of the peach trees (Lign. Z, fig. 3), imparting to them an appearance as if a coating of fine white powder had been sprinkled over the surface, and giving the grass an unhealthy aspect.

DESCRIPTION OF FUNGUS.

Group Ascomycetes.—Asci formed from the fertile cells of an hymenium. Sporidia definite, or indefinite, produced from the protoplasm of elongated or dilated cells. The fertile plants are frequently accompanied by inarticulate or separate, simple or branched threads, which are abortive asci, known under the name of Paraphyses.

Order Perisporiacei.—Asci often evanescent. Perithecia free, astomous; at length dehiscent, often surrounded by variously shaped threads distinct from the mycelium. Asci springing from the base, tubular or saccate, often absorbed at an early stage; occasionally solitary.

Genus Sphaerotheca—Sphaerotheca Persica, Salisb.—This plant—which is a true parasitic fungus—belongs to the group or division Ascomycetes; the order Perisporiacei and the Genus Sphaerotheca. I do not find specific descriptions that are applicable in all respects to this species. The nearest approach to it is the S. Castgnei. I therefore name it after the specific name of the peach plant, to which it is so destructive.

This epiphytal plant is one of the simplest of fungi. It belongs to a group which is distinguished by the great development of the mycelium. Many of these grow on living leaves, and are very destructive—either by directly diverting the nutritive juices from their proper office and appropriating them to their own use, or by blocking up the stomates and impeding respiration and the free action of the rays of light and of the surrounding atmosphere, thereby involving them in disease which often results in death. The fertile threads are moniliform (figs. 1, 2, 3, Lignographs Y and Z), made up of oblong oval sporidia, arranged end to end, from which the enveloping asci are evanescent, or are early absorbed. The sporidia

are shed from the summit of the threads, as they mature. They are very prolific on the tender leaves of the peach tree and poa pratense, from the 10th of May to the 15th of June, in this climate (in New York and the Eastern States the range is from about the 15th to 20th of May to the 20th and 30th of June), covering the leaves with piles of pearl white sporidia. During this period they are furnished with abundant nourishment from the young, tender and vigorously growing leaves, to which they are mainly confined; and the threads are mostly fertile, producing enormous numbers of sporidia.

From the 15th of June to the middle of August or first of September, the fertile threads are constantly decreasing, and the sterile threads (figs. 2, f and 4) begin to appear among the fertile ones. These sterile threads are longer and much more slender than the fertile threads, and are not moniliform. During this period, these sterile threads appear abundantly on the young, tender twigs (fig. 4). They occur also, to some extent, on the leaves, mingled with the fertile threads (fig. 2, *f*). These sterile or inarticulate threads are abortive asci, usually simple; and are called paraphyses. They constitute one of the peculiarities of the Ascomycetous group.

From the 15th of June to the 1st of September may be denominated the period (in this fungus on peach leaves and sprouts) of sterile development. This sterile growth exhausts the peach plant very much less than the fertile or period of reproductive growth which precedes it. The result is, those peach trees which have not become too much exhausted, revive and constantly assume a more and more healthy appearance, as they advance into this stage of sterile growth, and the fungus plants grow more and more sickly, and there is less and less of the sterile threads. By the first of August they have entirely disappeared from the leaves of the poa pratense.

The period then of the greatest ravages of the S. Persica, in any locality, is from the moment the young leaves make their appearance till the tissues of the leaves become firm; at which time the trees that survive begin to assume a more healthy aspect. In instances where the leaves are killed early in the season, and the trees not killed, another crop of leaves often make their appearance; which second crop—although presenting generally a feeble appearance—are not usually much affected with this fungus. The mycelium is greatly disproportionate to the fertile threads. Often leaves become curled and killed, before any signs of either fertile or sterile threads appear above the surface. When, however, the fertile threads do appear, they are prolific. They consist of very large, oblong, prolate, spheroidal sporidia; occasionally single; but generally consisting of more or less erect simple or compound moniliform chains (threads) of

sporidia (fig. 1). Sporidia simple, whether single or arranged in necklaces; sporidia armed with processes at each end, by which they are united to each other. In the advanced stages of the fertile plants, pyenidia are not infrequent; sporidia deciduous falling from the summit of the moniliform threads as they mature.

Fig. 1, Lignograph Y, represents the appearance, in Central Ohio, of the fertile plants on the peach leaf, on the 20th of May. At this date they were very prolific—killing the leaves on most of the older and weaker trees. The leaves on the young vigorous trees were twisted, curled, blistered, overgrown and yellowish.

Fig. 2, *d*, *e*, *f*, represents the appearance of the plants on the leaves, on the 5th of July. The sterile plants (*f*) and maturer threads, with pyenidia (EE), had begun to show themselves among the fertile threads (*d*). On the older leaves, at this date, the plants had the appearance seen in fig. 6, *a*, *b*, *c*.

Fig. 3 represents the plants as they appeared on the leaves of the poa pratense on the 20th of June. They were very prolific, covering the whole surface of the leaves with their white sporidia.

Fig. 4, Lignograph Aa, represents the appearance of the sterile plants on the young shoots of the peach tree, July 21st. The numerous sporidia attached to them and lying at their base, probably have fallen from the fertile plants, off the young leaves. The *paraphases* are, however, said, in some instances, to provide sporidia from their summits.

Fig. 2, E, E, are mature plants with enlarged joints, called pyenidia. These pyenidia are of a light-yellow color, and are filled with stylospores.

Figs. 1, 2 and 3, Lignographs Y and Z, represent fertile plants, during their reproductive stage—from May 10th to June 15th. After June 15th these fertile plants rapidly disappear, except on such new leaves as make their appearance thereafter—on which they are often found, but present generally a sickly, feeble appearance, when compared with the vigorous growth on the leaves from the 10th of May to the 15th of June. After the 20th of July, there can scarcely be found a plant on the leaves in this stage of development; they nearly all have the appearance as seen at fig. 6, *a*, *b* and *c*, Lignograph Y. Occasionally may be found a new leaf where the appearance is presented as seen at fig. 2, *d*, *e* and *f*.

Fig. 5, Lignograph Y, represents the appearance of the mycelium in the parenchyma of leaves. The mycelium is often largely developed before there is any appearance of fertile threads on the surface. The indication of its presence—where there are no external threads—is the blistering and curling of the leaves.

The young twigs and sprouts are also attacked with this fungus. It

generally appears on them during the last half of June. They produce, mostly, only sterile threads.

The peach fruit is often attacked, about the time it is from one-third to two-thirds grown; but the fungus is usually neither thrifty nor prolific, till the peaches approach maturity. It however often destroys the entire crop before the fruit matures. If the fungus is in the trees, and the peaches escape till they begin to ripen, it then usually makes great ravages. At this stage of the fruit, the mycelium grows with great luxuriance in its tender, rich flesh, and decay keeps progress with the advance of the mycelium. An entire peach will often decay in from 24 to 72 hours—the length of time required varying with the temperature and hygrometic condition of the atmosphere. Often on the decayed surfaces may be discovered the fertile, moniliform threads, both simple and compound (fig. 7 *a*, Lignograph Bb). The sporidia are smaller in size on the fruit, than in plants on the leaves. Fig. 7 shows the mycelium, and the fertile threads on the fruit; figs. 1, 2, 4, 5, and 6 show the fertile and sterile threads and mycelium of the leaves and twigs. The mycelium of the leaves is more filamentous and less fleshy than that of the fruit, and the sporidia of the concatenated, fertile threads larger.

OBSERVATIONS CONNECTED WITH THE DECAY OF THE FRUIT AND WITH FUNGOID DEVELOPMENT.

A young, vigorous tree, the leaves of which had been severely attacked with the peach fungus in the early part of the season, but which had by the middle of August quite recovered, was loaded with fruit. The fruit had escaped the fungus during the early part of the season. About the 16th of August the peaches began to get mellow. About the same time they began to decay rapidly. Soon after the decay commenced, a white, almost invisible mould (soon turning to a brownish yellow) appeared in spots on the surface of the affected parts. On examining this under the microscope, the appearance was presented as seen at fig. 7, *a* and *b*.* The line *cd* in the figure, represents the line described by the surface of the peach; all above this line belongs to the aerial portion of the plant; these are the fertile threads that bear the sporidia. All below the line *cd*, represents the mycelium or roots, inside the surface of the peach.

The mycelium is large, rugged, and of luxuriant growth. It advanced with great rapidity through the soft tissues. As fast as the mycelium

* The peaches on this tree were nearly all destroyed in a few days by the *S. Persica*. The fruit of many other trees in the same orchard decayed in the same way. I mention this case as a sample of what often occurs when the trees are filled with this fungus.

advanced in the flesh, decay followed. One-fourth of an inch beyond the line of decay, in the sound part of the peach, no mycelium could be traced. The cells, however—seen at figs. 8, 9, 10 and 11, Lignographs Cc and Y—were noticed scattered through the sound, fleshy tissues; and also the peculiar forms seen at fig. 12, Lignograph Dd, were occasionally met with. Fig. 8 *a*, Lignograph Cc, represents sporidia, and new filaments of mycelium, just beginning to vegetate. These sporidia are often met with lying in masses in the flesh, as seen in the figure. Fig. 10, Lignograph Y, represents cells of the yeast plant; *e*, fig. 7, Lignograph Bb, represents a budding and branching filament, emanating from a sporidium.

August 9th, 4 P.M., peeled a number of ripe peaches and placed them in an earthen dish, mashing them to a jelly and adding about one half their bulk of water, and set them aside, at a temperature of about 75° Fah. Six hours after, examined them under the microscope. Found the surface portions completely alive with minute, tremulous, vibrating cells, either single or arranged in lines (fig. 13, Lignograph Ee). These belong to the so-called vibriones. The following morning—16 hours after the mixture was made—examined again. Found many of the minute bodies (fig. 13) moving actively about—some in curved lines, and others in zig-zag, progressive ones. There was also noticed large oval and spherical cells (vitalized cell), having a tremulous and vibrating motion (fig. 14, Lignograph Ee). The larger of them could be seen to contain minute cells.

Aug. 11, 8 A.M.—The vitalized cells (fig. 14) have assumed the appearance seen in fig. 15. They are quite numerous, and appear to be zoospores. A white mould began to appear on the surface. The surface layer was filled with organized cells (fig. 16) and the mycelium, represented at fig. 17, Lignograph Ff. The zoospores perform the office of organizing these cells (fig. 16). At first the cells in the zoospores are spherical. Their progressive movement, and rotary motion on their progressive line as an axis, rolls the spherical cells into cylinders (fig. 16), when they are voided from the posterior end of the cell. This is a process in the multiplication and organization of cells which, so far as I know, has not before been noticed.*

Fig. 18, Lignograph Dd, represents the spores of the peach fungus vegetating in the flesh of the peach.

Aug. 20th. Placed a broken, ripe peach, about one-fourth decayed (fresh picked from the tree, on the decayed part of which was growing the

* This mode of the organization and multiplication of cells will be more fully described in another paper, "On cell organization in the various processes of the fermentation of organic matter, vegetable and animal."

fungus, fig. 7 *a*, Lignograph Bb, and all through the decayed tissues ran the mycelium, fig. 7 *b*), in a loosely-covered glass jar, with about one-sixth its bulk of water, and set aside, at a temperature of 75° Fah.

Twenty-four hours after, examined the peach. It was entirely decayed, and covered, over the whole surface, with a luxuriant growth of the fungus, fig. 7 *a*, and through the entire flesh ran the mycelium, fig. 7 *b*. In the newly decayed portion there were many vegetating sporidia and zoospores (fig. 19, Lignograph Dd). At *a*, are seen two sporidia, the filaments from which anostomoze with each other and are thickly budded.

Fig. 20, Lignograph Dd, represents vitalized cells (so-called vibriones), which posses animalcular motion and are very active, moving rapidly in all directions. There are grounds for believing these bodies to be spermatozoid in character.* They occur in great numbers in all fermenting and decaying bodies.

August 21st, 10 A. M., placed some sporidia of the peach fungus (*S. persica*) in a solution of sugar in a watch-glass, at 75° F. At 3 P. M.—five hours after—they had vegetated as seen in fig. 21 (Lig. Gg). August 22, 6 A. M., twenty hours after, they had vegetated as seen in fig. 22, (Lig. Dd). Wherever two or more sporidia were near each other, germinating filaments had passed from one to the other, joining them all; and the larger filaments, wherever they had come in contact, had united, producing a system of anostomoses, as seen in Fig. 22.

August 23, 8 A. M., forty-six hours after the sporidia of the peach fungus were placed in the saccharine solution, they had begun to branch, and presented the appearance seen in fig. 23, (Lig. Hh).

Progress of the disease in Ohio in 1862.—The young leaves of the peach trees were attacked with the peach fungus (*sphasaotheca persica*) about the 10th of May, soon after the blossoms had fallen. The attack was general throughout the State, killing nearly all the leaves on the older trees, and on the younger ones where they were not vigorous and healthy. On the young, thrifty trees the leaves became thickened, curled, twisted, blistered, overgrown, and yellowish. The more vigorous trees were attacked less than the weaker ones. This parasite spread rapidly in and on the leaves till about June 15th, when it began to decline, and the peach trees began to recover and assume a more healthy appearance. On the 25th of June the trees had very much improved; the leaves had a more healthy green and were less curled. By the 21st of July the fertile plants had almost entirely disappeared, except now and then a few on the new leaves, where they were still developed, but in an enfeebled condition. The pear leaves

* In a paper on which I have been for some time engaged, connected with decay, gangrene, fermentation, &c., I shall have more to offer in relation to these interesting little bodies.

were slightly attacked by the same fungus, during the period of the attack on the peach leaves.

The young peach shoots were first attacked about the 15th of June. The plants produced by them were mostly sterile.

The fungus was first noticed on the peach fruit when it was about one-third grown, causing a great share of the crop to wilt, decay, and fall. The portion of the peach crop which survived, was again attacked at the period of its ripening, producing rapid decay in much of the mature and maturing fruit.

PROPHYLACTICS.

Among these may be classed sulphur, sulphurous acid, sulphites, sulphuric acid, and sulphates. These bodies are all more or less destructive to mucedinous growths, and have the power of stopping fermentation. Especially is this the case with sulphur, sulphurous acid, the sulphites, and sulphuric acid. The influence of the sulphates is not so marked.

The wine-grower controls the vegetation of his yeast plants (fermentation) by burning a little sulphur or a few matches in the casks. The sugar manufacturer checks mucedinous cellular development in the juice of the cane (preventing the formation of glucose, which would interfere with granulation) by adding a few drops of sulphuric or sulphurous acid, or a small quantity of some soluble sulphite to the freshly expressed juice.

The experiments which I have performed in this department, were commenced late in May, after the young leaves were completely filled with the mycelium of the peach fungus. The results, therefore, could not be as satisfactory as if commenced when the buds were unfolding into leaves. The sporidia are mostly in the circulating juices of the tree, and in their passage become fixed, and vegetate in the tender developing leaf tissues, which afford them a matrix, with abundant nutrient supplies. The preventative should therefore be applied, so as to enter the sap of the tree in its early circulation in spring, as soon as the flower buds begin to open, that they may reach the sporidia before they begin to vegetate. To this end I would suggest the digging away of the sod around the trees, and the application of a compost containing either sulphur, sulphurous acid, sulphites, or sulphuric acid. The refuse gas lime from the purifying vats of gas establishments, either alone or mixed with coal ashes, cinders from foundries, iron furnaces, and blacksmith shops, or the pitch from coal oil refineries boiled down to asphalt and pulverized, furnish cheap and appropriate materials for the purpose, containing the desired bodies for checking mucedinous growths. These should be mixed with good soil (half

and half) before being applied. These bodies all contain valuable nourishment for the trees. They will also guard against many depredations from insects. Care should be taken not to use the gas lime too liberally. When all of these materials can not be obtained, any one two or more may be used. There may also be an advantage derived from scattering a little flour of sulphur over the leaves in their early development. The virtues of this body probably lie in its gradual oxydation, forming sulphurous acid.

ADDENDA.

Since the foregoing was prepared for the press, we have made the following examinations:

March 3d, 1863.—Examined the swelling buds, and the sprouts of last year's growth of peach trees. The outside bark of the twigs is filled with the spores and mycelium of the peach fungus, and the surface of the twigs is marked by numerous patches of a whitish-gray color, and having a crisped appearance. These patches cover from one-fourth to one-half their surface. Wherever these patches extend, the leaf buds are small and appear shrunken, and many of the flower buds have a dark, dead speck in the centre. Fig. 25, (Lig. Y) presents the appearance of the mycelium and fertile threads, running into lines and branches of spores in the patches of fungus, on the surface of the sprouts and twigs of last year's growth.

LOCUSTS.

Cicada Septemdecem.—Seventeen Year Locust—Red Eyed Locust.

The locusts commenced making their appearance in Fairfield county, Ohio, in 1863, about May 25th. On May 31st, after some slight thunder showers, they began to make their appearance in multitudes; and on June 1st, 2d, and 3d, they multiplied greatly, so that there was scarcely a square foot of ground which did not contain several pupa cases, and holes from which they had escaped from the soil. On the trunk of a single apple tree, attached to the bark, I have counted as high as sixty-three pupa cases, from which the insects had escaped; while the limbs of the tree, and the ground beneath, were covered with them. This was general throughout the forests and orchards, while they were less numerous in cultivated fields. On June 2d and 3d, they began to fly in large numbers from tree to tree.

June 15th.—The forests and orchards are alive with locusts. A single

tree often contains over a hundred of these insects. Dead locusts begin to appear quite abundantly under the trees in the forests.

June 18th.—Locusts appear to be increasing in number, notwithstanding many are dying. The ends of branches and twigs of fruit and forest trees begin to wilt and die quite extensively, from the borings of locusts (locusts depositing their eggs).

June 26th.—Locusts disappearing slowly; many are dying. Fruit and forest trees are considerably injured by them. Weather has been very dry. Last night a drizzling rain commenced, continuing through the night and most of the day. The soil is wet about six inches below the surface. Wheat harvest will commence here about July 1st.

APPLE BLIGHT AND PEACH CURL IN 1863.

APPLE BLIGHT.

The blight attacked the apple, pear, and quince trees, in central Ohio, in 1863, on the 31st of May. There had been some three weeks of very warm, dry weather, quite free from dews and night vapors. The soil had become very dry, and the grass had begun to wither. On the 31st of May there were several small, warm showers, with thunder, followed by fogs and night vapor. On the morning of June 1st, the apple leaves began to wilt, and numerous dead patches were noticed on the small twigs and limbs. This was the first perceptible indication of the disease in this region. From this the disease slowly progressed, invading the apple more than the pear and quince trees.

June 18th.—The blight is progressing but slowly. Has done yet but little injury. The whole of the month of May, and to this date in June, the weather has been unusually dry. The grass has quite ceased growing, and is now drying up; and pastures and meadows are deadening.

Fruit trees have made but very little new wood so far. On account of the dry weather the growth has been unusually slow, there being a deficiency of juices, apparently, in the trees. This slow growth and deficiency of sap, appears to be the cause of the slow progress of the disease, the new layer of wood not being soft and juicy enough to enable the *apple blight* fungus to grow with its usual luxuriance.*

June 26th.—Disease quite at a stand. Has attacked yet but comparatively few trees. Invasion slight, and has done but little injury. Weather has been very dry up to last night, when a drizzling rain set in, which has wet the soil about six inches deep.

* The extended deadening of the ends of the branches and twigs of fruit and forest trees, since June 18th, produced by *locusts* depositing their eggs, should not be confounded with the apple blight.

PEACH CURL.

The peach fungus commenced its ravages in 1863, in central Ohio, in the buds during the warm weather in the month of March. It attacked the flower buds, producing in their centre a dark, dead spot, destroying much of the fruit in its embryonic state; so that usually the trees produced but few flowers. As early as the leaf-buds began to be developed into leaves, the fungus was noticed in them, causing them to curl and blister as they opened. The fungus is more destructive to the fruit and less to the leaves this year than last.

June 3d.—The majority of peach trees in central Ohio are suffering more or less from the ravages of the peach fungus. Many of the older trees are losing their leaves, while on others many of the leaves are blistered, curled, overgrown, and twisted, so that they imperfectly perform their normal functions.

June 18th.—The peach fungus is beginning to attack the young peach fruit. The leaves are not so universally attacked as they were last year. This is probably owing to the extreme dry weather, on which account the trees have made but little new wood, and the leaves are less tender and succulent than usual. This firmness of the tissues renders the trees less susceptible to invasion, and to the rapid growth and progress of the peach fungus, after it has once gained a foothold.

GLOSSARY.

In writing out careful investigations upon subjects of this kind, it is necessary to use so many terms that are not expected to be generally understood by the mass of readers—to whom the results of such labors are the most valuable—that their usefulness is much limited, unless connected with the descriptions are explanations that render the terms used readily comprehended. The following definitions of the terms employed, we trust, will enable every farmer and fruit grower to peruse these examinations with interest and profit:

Abortive—Unproductive.

Asci—Vessels that contain the reproductive bodies of flowerless plants. These reproductive bodies when produced in asci, are called sporidia, to distinguish them from reproductive bodies not produced in asci, which are called spores.

Astomous—Mouthless, or without openings.

Anastomosing—Uniting or inosculating of vessels.

Antherozoid—Sperm cells of cryptogamic plants.

Ascigerous—Producing asci.

Algology—The science of sea-weeds.

Blight—A vague term, signifying a pestilence among plants, caused by the attack of insects or of parasitic fungi, or some endemical affection of the atmosphere, not fully understood.

Cambium—The soft matter that is to form the new annual layers of wood and bark.

Carbonized—Burned to a coal, or having the appearance of being charred.

Cellular—Composed of cells.

Ciliæ—Hairs like those of the eyelashes.

Cortical—Belonging to the bark.

Cryptogams—Flowerless plants.

Deciduous—Falling off.

Dehiscent—Bursting open.

Epidermis—The outside skin of the bark.

Epyphytes or *Epiphytal*—Plants that grow upon other plants, or upon their leaves.

Evanescent—Quickly vanishing.

Endochrome or *Protoplasm*—The unimpregnated sporules of a spore cell.

Epispore—The outer membrane of a spore, where the membranes are double.

Excipulum—A perithecium that is never closed.

Fertile Threads—Those that produce fruit.

Fungus—Having the substance of fungi or mushrooms.

Gonidia—Joints.

Hyaline—Pure white, or bright and pure tints.

Hymenium—A layer or mass of cells, from which are developed fertile threads or spores.

Inarticulate—Not jointed.

Matrix—A place where any thing is generated or formed.

Meshes—The openings in any tissue.

Moniliform—Like a necklace or string of beads; that is to say, with alternate swellings and contractions.

Mycelium—Roots, or their equivalent.

Mycology—The science of moulds.

Mucedinous—Having the appearance of moulds.

Osteolum—Mouth or opening through which the Apothecia in lichens shed their spores.

Ovate—Egg-shaped.

Oval—Having the figure of an ellipse.

Perithecium, *Peridium*, and *Prisporium*—Vessel in which stand the Asci, or different kinds of envelopes of the reproductive organs of fungi.

Parasite—A plant growing on other plants.

Protoplasm—The Endochrome, or unimpregnated sporules of a spore cell.

Prophylactics—Preventives.

Pullulation—Budding.

Pycnidia—Enlarged joints in fertile threads, filled with Stylospores.

Pileus—The umbulla, top of agarics or common mushrooms.

Prothallus—A peculiar body produced from some Cryptogams, which is capable of producing spores like those from which the original plant sprung. It is an intermediate body between the plant and the spore.

Pustule—Cavity that contains spores or fruit.

Paraphyses—Threads arising often with asci, leaving spores sometimes on their summit. They are abortive.

Saccate—In the form of a sack.

Spermatagonia—Bodies developed at the joints.

Spermatozoids—The sperm or male cells of cryptogams or flowerless plants.

Sporidia—Spores contained in asci.

Spores—The seed or reproductive bodies of flowerless plants.

Spermatia—Spores of a second order.

Sporopharous—Those fungi which produce naked spores.

Sporangium—Spore cases, or vessels in which spores are produced.

Sporidangia—The minute sporidia in what is called a vesicle. The vesicle takes the place of an ascus.

Sori—A form in which the spores are arranged.

Sporophore—A large body, or spore that produces spores on its summit.

Spermatia—Sperm cells

Stylosphores—Spores of a second order.

Sterigmata—The threads or peduncles rising from the sporophores, and on the terminus of which are produced spores.

Stroma—A vessel, or capsule, which springs from the mycelium, and contains the asci, utricles or perithecia.

Ste rileanpa ls—Those threads that do not produce fruit.

Stomates—Little mouths or openings on the under side of leaves.

Thalamium—Hymenium of lichens.

Trichotamous—Branches divided into threes.

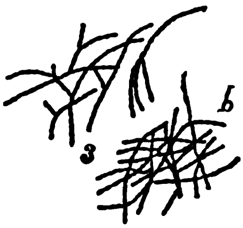
Tubular—Like a tube.

Vesicles—Hollow sacks resembling bladders.

Volva—Sheath around the base of the stem, or basidium in "mushrooms."

Zoospores—Vitalized cells or spores, armed with ciliæ or filaments, and having the power of independent motion.

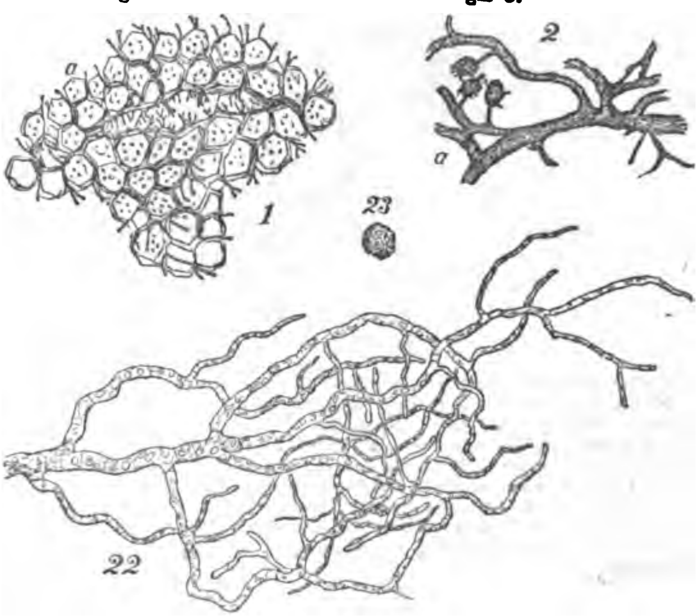
LIGNOGRAPHS REFERRED TO IN THE PRECEDING ARTICLE.



Lign. A.

Lign. C.

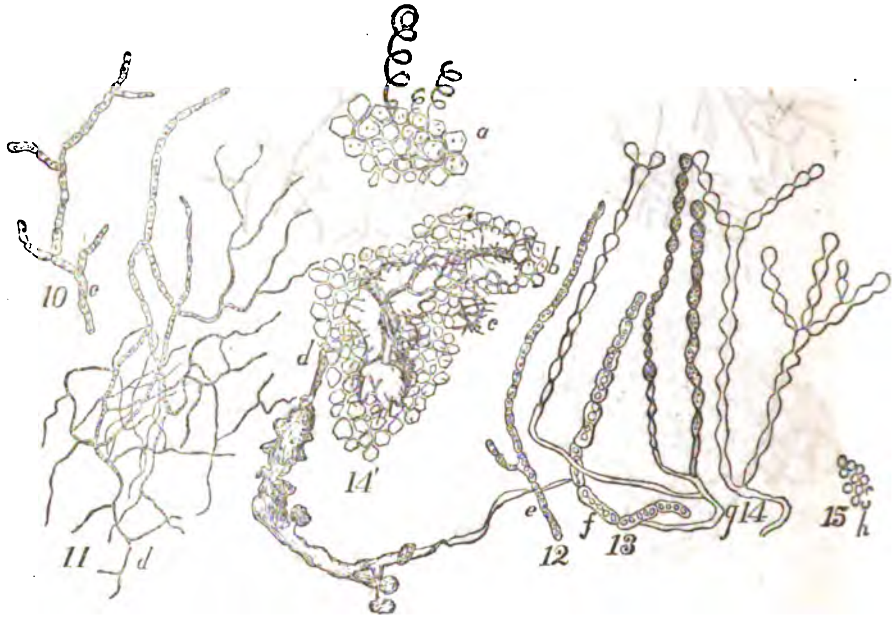
Lign. D.



Lign. B.

Lign. F.

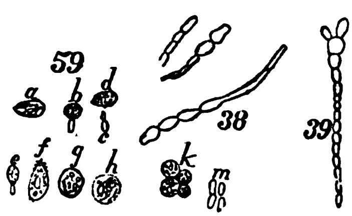
Lign. G.



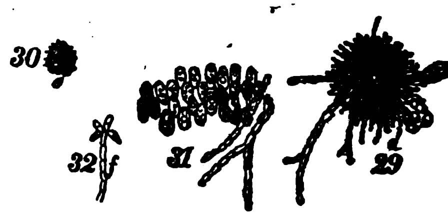
Lign. R.

a. Cross section of a portion of the twig of a quince bush, showing spiral fibers, which appear to be fungoid. This section is the outside layer of wood, in the portion of the limb at the line of demarkation, between the dead and living tissues.

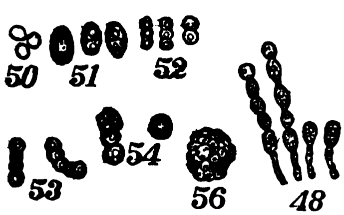
b. Cross section of a portion of the same twig, at the point where the blight first attacked it, and at the time of examination perfectly dead and dry. The limb was cut off and examined on the 14th of July, 1862. The blight struck the bush about the 15th of June. In the open spaces in the cellular tissue, are seen fungoid growths; also outside, at *c* and *d*, are seen similar growths. From the boundary walls of the interstices, are seen numerous fungoid vegetating points. On the plant at *d*, is seen something like sporangia. This appears different from the growth in the interstices.



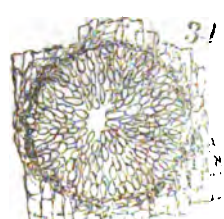
Lign. H.



Lign. K.

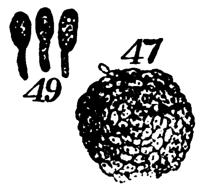


Lign. J.

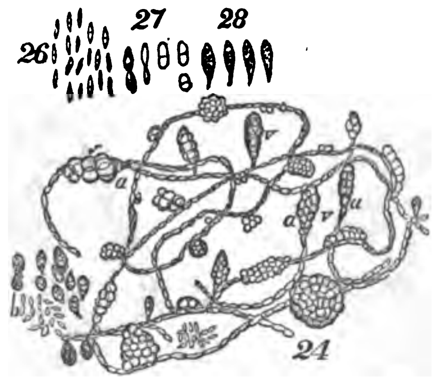


Lign. L.

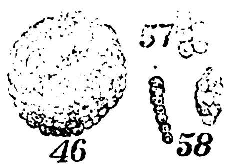
Lign. M.



Lign. N.

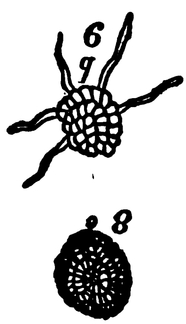


Lign. P.

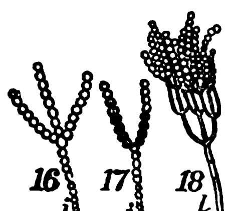


Lign. O.

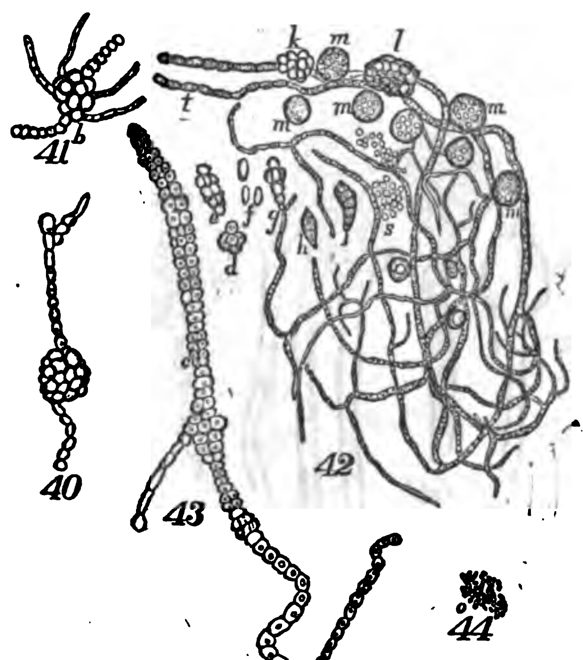
Lign. R.



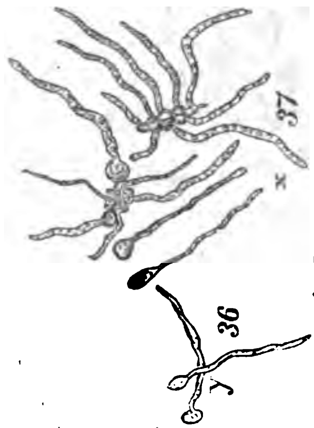
Lign. S.



Lign. T.

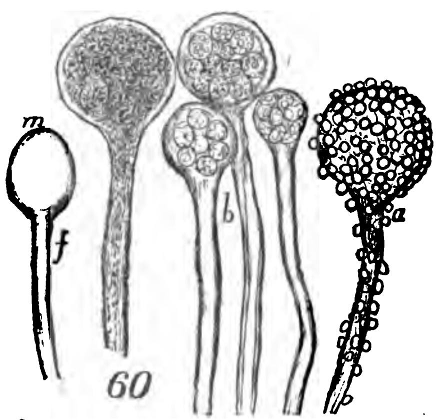


Lign. Q.

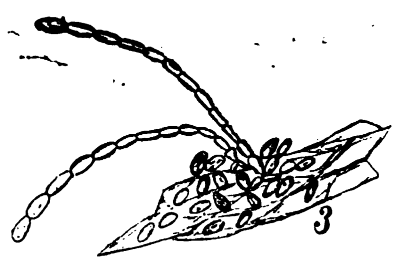


Lign. U.

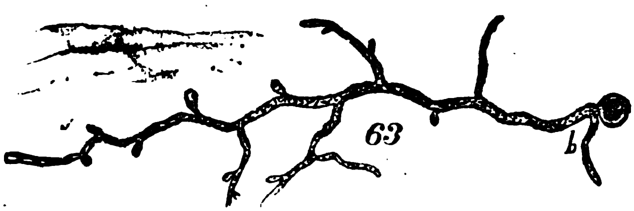
Lign. V.



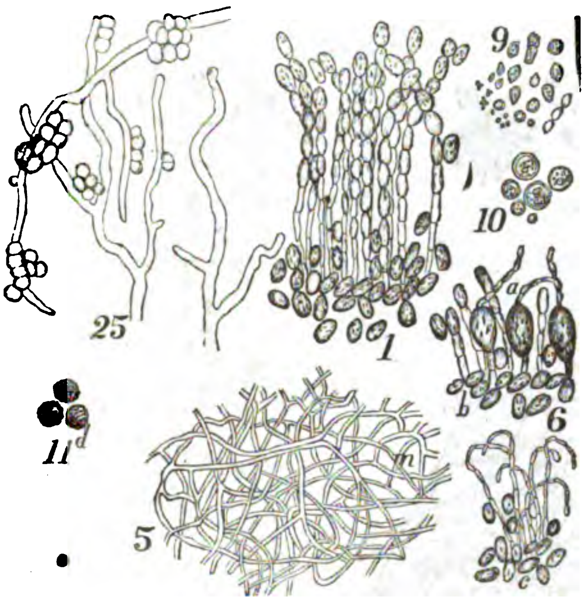
Lign. W.



Lign. Y.



Lign. X.



Lign. Y.

Lign. Aa.

Lign. Cc.

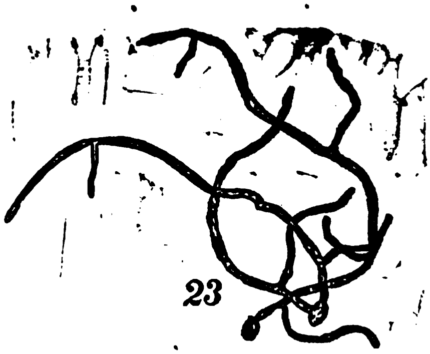
Lign. Gg.

Lign. Bb.

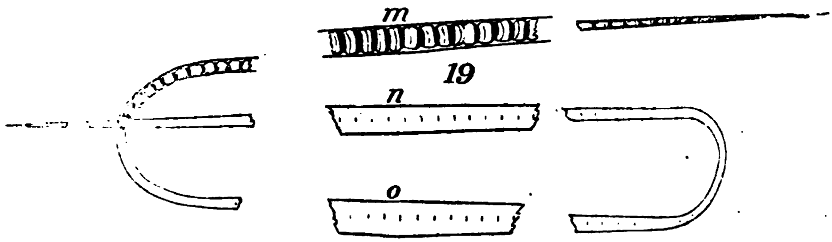
Lign. Ee.

Lign. Dd.

Lign. Ff.



Lign. Hh.



m, n, o. **Resembles the hair of a rat, in structure. Examine the hairs of squirrels, mice, &c.**

MEMORANDA ON THE CEREALS.

In 2,280 lbs. of grain of Indian corn (per acre), there are 0·6 lbs. of silica, 2·12 of phosphoric acid, 0·2 of lime, 0·54 of magnesia, 0·2 of peroxyd of iron, 11·2 of potash. In 100 lbs. of wheat (grain) there are 1·67 lbs. of ashes; in wheat straw, 5·10 lbs.; in the grain of barley, 2·34 lbs.; straw of barley, 5·36 lbs.; in grain of oats, 2·90 lbs.; straw of oats, 5·10 lbs.; husks of oats, 6·79 lbs. In 100 lbs. of rye grain, 1·36 lbs. of ashes, and 4·10 lbs. in rye straw. In Indian corn grain, 4·40; in straw of same, 4·40. The seeds of oats, barley, and wheat, will preserve their vitality for three or four years. In 2,240 lbs. of the *grain* of barley, there are 99½ ounces of potash, 104 of soda, 39½ of lime, 64 of magnesia, 76 of phosphoric acid, 31 of sulphuric acid, 4 of salt, and 416 of sand.

Average proportion of kernel and husk of beans, 85 of kernel to 15 of husk. Average proportion of straw of peas to grain, 73 to 27. Average proportion of straw to grain of beans, 57 to 43.

Wheat sown to a depth of one inch, came up in twelve days, the whole of these seeds germinating. Dr. Voelcker's experiments on the top-dressing of wheat, showed amongst other things that nitrate of soda, applied by itself, naturally increased the yield, both of straw and corn; and that the mixture of salt with the nitrate of soda was beneficial.

A writer in the Farmer's Magazine, on the subject of bean sowing, says: "If you practice thin sowing, take care that you have plenty of seed in each row, but let the saving of seed be in having the rows widely apart. You thus secure regularity and sufficiency of plants, while great space is provided for their full development." The proportion of straw to grain in oats is as 62 to 38; of rye, as 71 to 29; of peas, 73 to 27. The weight of wheat straw per acre is estimated by Johnson at 3,000 to 3,600 lbs.; of oat, 2,700 to 3,500; of barley, 2,100 to 2,500; of rye, 4,000 to 4,800; of bean, 2,700 to 3,200; of peas, 2,700 lbs. A ton of the grain of beans contains 9½ lbs. of potash, 1⅛ of soda, 14 of lime, 4½ of magnesia, 5½ of phosphoric acid, ⅞ of sulphuric acid, 2 of salt, and 5 of sand.

The average weight per bushel of barley is 50 to 55 lbs.

Wheat sown to a depth of five inches, came up in twenty-two days, three-eighths of the seed germinating.

Chloride of lime steep for wheat:—Mix one pound with a gallon of

water; allow the mixture to stand for an hour, frequently stirring it. Allow it to settle, and draw off the supernatant liquid. In this steep the seed for two hours, drain and dry it with ashes. An acre of wheat, top-dressed, with 180 pounds of nitrate of soda, and 1½ cwt. of salt, yielded 2,436 pounds, or 40 6-20th bushels; the money increase in corn over a plot unmanured, being 32s. 6d., and the profit 31s. 11d. An acre of wheat, estimated at twenty-five bushels of grain, of sixty pounds to the bushel, gives 1,500 pounds of grain, containing 30 pounds of ash. The weight of straw will be 3,000 pounds, containing 180 of ash.

The weight of grain and straw of wheat as above, yields 210 pounds of ash, which analysis shows to be made up thus:—Potash, 29·59 lbs.; soda, 3·02; lime, 12·94; magnesia, 10·52; oxyd of iron, 2·55; phosphoric acid, 20·56; sulphuric acid, 10·56; chlorine, 1·97; silica, 118·29.

Wheat sown to a depth of four inches, came above ground in twenty-one days, one-half of the seeds germinating. An acre of wheat, top-dressed, with 1½ cwt. of nitrate of soda, yielded 2,280 pounds, or 38 bushels; the money increase of corn over a plot unmanured being £2, 17s. 9d., yielding a profit of 25s. 3d. A crop of oats, estimated at 48 bushels, of 42 pounds to the bushel, will weigh 2,016 pounds, containing 60·5 pounds of ash. The weight of the straw will be 3·024 lbs., containing 138·4 lbs of ash. The weight of grain and straw of oats per acre, as above, yields 198·9 lbs. of ash, which analysis shows to be made up thus:—Silica, 96·8 lbs.; phosphoric acid, 22·3; sulphuric acid, 58; lime, 11·0; magnesia, 9·1; peroxyd of iron, 2·7; potash, 36·5; soda, 3·6; chloride of potassium, 3 8; chloride of sodium, 6·3.

Wheat sown to the depth of six inches, came up in twenty-three days; one-eighth only, however, of the plants came up.

Dr. Voelcker states that wheat, top-dressed with guano at the rate of 2½ cwts. per acre, yielded 2,404 lbs., or 40 1-20th bushels, at 60 pounds to the bushel. The increase of produce of the plots manured as in the above paragraph, compared with like plots unmanured, was £3, 8s. 9d.; the cost of manure, £1, 12s. 6d.; the clear profit being £1, 16s. 3d. A writer in the Farmer's Magazine states that he has seen beans in single rows, five feet apart, produce fifty imperial bushels to the acre. A crop of barley carries off the soil 56·3 lbs of inorganic matter in the grain; in the straw, 157·0; in all, 213·3. The crop in this case is estimated at 48 bushels, at 55 pounds—2,640 pounds; the straw and chaff at 3,300 pounds. Average weight per bushel of wheat, 60 pounds; of barley, 53; of oats, 42, and rye, 54 pounds.

In 100 parts of the ash of oat straw, there are 29 of potash and soda—19 in the grain.

Table showing the mean Winter and Summer temperatures of the chief corn producing countries in the world.

European Countries.	Places of Observation.	North Latitude.	Mean Temperatures of the Winter and Summer months. Dec., Jan., Feb.	June, July, Aug.
I. England:		° ′	° ′	° ′
1. Central England as observed at Malvern, Bedford, Southwick, Lyndon and Norwich	Malvern, &c.	52 23	39 87	61 23
2. Western England as observed at Penzance, Helston, Truro, Plymouth, Torquay, Exeter and Sidmouth	Penzance, &c.	50 70	43 15	61 13
II. Countries of which the Winter temperature is below, and the Summer temperature above that of England:				
EUROPEAN.				
1. Northern Russia	Petersburg	55 56	21 78	62 44
	Moscow	55 45		
2. Poland and Baltic Prussia	Dantzic	54 20	27 37	66 73
	Warsaw	52 13		
	Cracow	50 40		
3. Basin of the Elbe	Berlin	52 30	31 14	63 37
	Prague	50 50		
4. Holland	Haarlem	52·23	36 62	61 93
5. Belgium	Brussels	0 51	38 01	64 03
6. Basin of the Rhine	Frankfort	50 10	34 13	65 10
7. France	Paris	48 50	39 53	66 68
	Toulouse	43 36		
8. Basin of the Danube	Augsberg	48 21	30 68	65 90
	Vienna	48 13		
	Klausenberg	46 44		
	Bucharest	44 27		
9. Southern Russia	Chereon	46 38	31 58	70 25
	Sebastapol	44 36		
10. Basin of the Po	Milan	45 28	38 16	74 05
	Verona	45 26		
	Turin	45 11		
11. Basin of the Arno	Florence	43 47		
12. Turkey	Constantinople.	41 20	40 94	71 29
Mean of European countries	...	...	33 63	65 53
AMERICAN.				
13. Canada	Montreal	45 31	21 60	68 01
	Toronto	43 40		
14. United States	Albany	42 39	27 39	73 01
	Council Bluffs	41 25		
	Cincinnati	39 06		
Mean of American countries	...	...	24 49	70 51
III. Countries whose mean Winter and Summer temperature are both above that of England:				
EUROPEAN.				
1. Spain	Madrid	40 25	48 03	73 43
	Cadiz	36 32		
2. Portugal	Lisbon	38 42	52 52	70 94
3. Southern Italy	Messina	38 11	54 96	77 14
Mean of European countries	...	...	51 84	73 83
AFRICAN.				
4. Egypt	Cairo	30 20	58 51	85 10
AMERICAN.				
5. South-Western States of the Union	Fort Gibson	35 47	44 31	81 14

Table showing the mean relative values of the different kinds of Wheat quoted in the London Price Currents in the 5 years ending 1860.

	Average prices, years 1856 to 1860 inclusive.			Importations in the single year 1860.
BALTIC PORTS.	£.	s.	d.	*Quarters.*
Dantzic wheat: mixed, high-mixed, and extra qualities overhead....	3	4	0	1,149,532
Konigsberg: mixed and high-mixed..........	3	5	0	
Rostock: mixed and fine	3	0	6	169,977
Pomerania, Mecklenburg, and Uckermark: red..........	2	18	0	
Denmark and Holstein	2	13	0	
St. Petersburg and Riga..........	2	12	0	264,850
Silesia: red and white	2	16	6	218,000
				265,241
Average	2	18	6	2,067,500
English wheat: Essex and Kent, red and white; Norfolk, Lincoln and Yorkshire, red	2	12	0	
Average superiority of Baltic wheat over English wheat in the London market	0	6	6	
EXTRA BALTIC PORTS.				
Rhine and Belgium	2	10	0	107,775
France: two qualities..........	2	6	6	
Southern Russia: hard..........	2	7	0	1,665,942
Average	2	8	0	
English wheat..........	2	12	0	
				1,773,717
Average superiority of English wheat over wheat from extra Baltic ports..........	0	4	0	
American wheat:				
United States..........	2	15	0	1,570,796
Canada..........	2	15	0	320,835
				1,891,631
Average	2	15	0	
English wheat as before	2	12	0	
Average superiority of American over English wheat	0	3	0	
Average price of foreign wheat of all countries combined..........	2	13	10	
English wheat as before	2	12	0	
Average superiority of foreign wheat generally over English wheat..	0	11	0	

	Year.	Mean Summer Temperature.		Year.	Mean Summer Temperature.
Abundant Years.	1775	61.2	Unproductive Years.	1789	59.0
	1779	63.3		1792	59.4
	1791	60.5		1795	58.8
	1818	65.3		1799	58.7
	1822	63.2		1800	61 7
	1825	63.0		1809	59 7
	1826	65.0		1810	57.3
	1834	63.5		1811	59.3
	1835	63.6		1812	57.2
	1836	61.3		1816	56.4
Mean of the 10 years		63.0	Mean of the 10 years		58.8
Mean of the 65 years		61.0	Mean of the 65 years		61.0
Mean temperature of the observed years, plus		2.0	Mean temperature of the observed years, minus		2.4

THE SOIL WE CULTIVATE.

When we direct our attention to a more local branch of this important inquiry, so as to ascertain the matters removed from our cultivated fields by our ordinary crops, and returned to them by the farm-yard manure, then the chemist's aid becomes still more practically useful. Professor Anderson (*Transactions Highland Society*, 1861, *p.* 569) has lately endeavored to furnish the agriculturist with an approximate estimate of the various matters abstracted from the soil by the crops of a six-course rotation, and of the amount restored to the land by the ordinary farm-yard manure. The summary he gives of the total substances abstracted, is as follows:— The rotation, which is a severe one, being turnips, wheat, hay, oats, and potatoes, (the turnip crop weighing per acre 13½ tons; wheat crop, being seed, 28 bushels; the straw, 28 cwt., the hay, 2½ tons, the oats, seed, 34 bushels, the straw, one ton, and potatoes three tons).

	lbs.	oz.		lbs.	oz.
Potash	319	4	Sulphuric acid	78	7
Soda	66	6	Phosphoric acid	122	3
Lime	100	0	Silica	364	4
Magnesia	39	9	Nitrogen	274	0
Chlorine	58	9			

The quantity of matters removed, observes Professor Anderson, would have been considerably reduced if a second year of grass pasture had been substituted for one of the white crops. It may be noticed also, that as compared with the total quantities of the substances contained in ordinary

soils, the matters removed are very small; and even if the phosphoric acid of the soil does not exceed a quarter per cent., it could maintain such crops for 276 years; and the same remark applies to the other elements, so that the prospect of exhaustion is, at all events, not immediate. If, continues the Professor, we next endeavor to ascertain the quantities of the elements of plants restored to the soil by farm-yard manures, we are met by the difficulty of estimating its ordinary application, and also by our still imperfect knowledge of its average composition. The number of good analyses of farm-yard manure is still small, and owing to the great difficulty of obtaining a fair sample, considerable discrepancies are found in those which have been published. By selecting, however, those results which are most trustworthy, the following table has been calculated so as to show the quantities of mineral matters and nitrogen in different quantities of the manure. Twelve tons have here been selected as an average application; the others, 16 and 20 tons, as quantities not unfrequently applied. The following results are expressed in pounds avoirdupois:

	In 12 tons, lbs.	In 16 tons, lbs.	In 20 tons, lbs.
Potash	201	208	335
Soda	67	89	111
Lime	337	449	561
Magnesia	35	47	59
Chlorine	12	16	20
Sulphuric acid	84	112	...
Phosphoric acid	108	144	180
Silica (soluble)	269	358	447
Nitrogen	165	220	275

It thus appears that an application of 20 tons per acre is able to supply the elements of an ordinary rotation, some of them in just sufficient quantity, others in considerable excess. Such are the demands made upon the soil by the crops we cultivate; such are the supplies offered in return by our farm-yards. But after all these valuable organic matters are returned to the soil, another great supply of the elements of vegetable substances are of necessity derived from the air we breathe, and it was to render these gases available to the farmer to the greater extent that the Norfolk, or four-course husbandry was introduced.

DEEP STIRRING OF THE SOIL.

Deep stirring proves beneficial to certain soils, but not to all. Indeed, it is questionable if uniform deep stirring can be profitably practiced on the greater portion of the cultivated soils in the United Kingdom. To a

clearer understanding of the term "stirring," it may be necessary to state that it is used for the inversion or turning over of the soil by the plow, and is not intended to include the stirring of the soil or subsoil by any form of subsoil plow. It has been frequenlty asserted of late that all soils may be stirred to a greater depth than formerly, with an increase of their productive capabilities. Such statements should, however, be received with considerable distrust. Doubtless there are conditions which, if present, are favorable to deep stirring, but these conditions are rather exceptional than general. For instance, soils resting upon subsoils containing the constituents of plant life in higher proportions than they are present in the cultivated soil, can be profitably stirred to a greater depth, bringing a portion of the subsoil to the surface, to be incorporated with the soil. Also, where certain conditions are to be secured, deeper stirring may be advantageously followed out. For example, by increasing the amount of manurial applications, conjoined with the deeper stirring, heavier crops can be grown; the increased outlay being met by the increased produce. As a rule, it is by securing both conditions—deep stirring with frequent and liberal manuring—that the greater portions of the soils can with advantage be stirred to a greater depth than has hitherto been practiced. Whatever is the depth of soil stirred, that soil should be rendered highly fertile, and maintained in that condition by the application of manures.

Continued cropping, with the removal of a portion of the crops, will in time render most soils comparatively unproductive, however deep they are stirred. There are soils which cannot be stirred to a greater depth than formerly, without impairing their productiveness, even with an increase of manurial application. Soils of a friable, or of a retentive texture, resting upon open, porous subsoils, such as chalk, gravel, sand, &c., and soils, the texture of which has been improved by the application of clay, marl, shell-sand, &c., cannot be stirred to a greater depth without interfering in part with the improvement effected. Deeper stirring necessarily decreases the percentage in the soil of the material which had been applied to alter its texture. An additional application of the material will doubtless correct this, but the increased outlay may not always be covered by the increased produce. There are other descriptions of soils which it is not advisable to stir to a greater depth than formerly—light, sandy, and peaty soils, resting upon subsoils of the same character as the surface soil. Compression rather than deep stirring is the best method to follow in cultivating these soils. We include in this category not only those sands or vegetable soils which drift during gales, but soils of a texture which do not move with winds. It is generally maintained that by deep stirring a greater surface is exposed to the action of the atmosphere, and consequently that the constituents of plants are present in the soil, in a state

available for plants, in an increased proportion. The removal of the crops carries away part of the organic and inorganic constituents of plants, which are not returned in the farm-yard manure. If the cultivated plants confined their rootlets to the soil which has been stirred, this argument would have some weight, but when it is considered that nearly all of the cultivated plants send rootlets into the subsoil, the necessity for deep stirring is less apparent. If it is considered that the action of the carbonic acid conveyed to the soil is to decompose the mineral constituents of the soil, and that these, when rendered soluble, are liable to be washed out of the soil by rain-water, the question of deep stirring assumes a new phase. It is quite possible that certain soils, particularly in wet localities, are deprived of the constituents of plant life in a greater degree by the annual rain-fall, than by the annual cropping. Any one studying the actions of arterial, surface, and underground drainage, particularly during a continued rain-fall, will better understand what an amount of fertilizing matter is removed by the rain-water. Rapid running streams and drains remove soluble and insoluble constituents, besides the debris of the soil in a state of suspension. Also, slow-running rivers and estuaries in many parts of the United Kingdon, contain in a state of solution and suspension, the elements of plant life apart from finely comminuted portions of the soil, to an extent which few who have not considered the question, would imagine. In some cases they have been advantageously used to increase the fertility of the soil, by warping and irrigation. Egypt is the most notable example of fertility being maintained by the elements of plants and soils conveyed in the water. The soil of the cultivated portions of Egypt, to which irrigation is applied, has been gradually raised by the somewhat slow process of the Nile. The alluvial deposits on the banks of such outlets of rain-falls, as the Forth and Tay, show what steady causes are in operation, removing from the soil the elements of fertility. Liebig appears not to take this cause into account in his recent work on Modern Agriculture. It is a question which is open to discussion, whether or not the rain-fall conveys soluble and floating elements of vegetable life from the land to the sea in a greater extent than the whole sewerage of towns. Of course, the amount conveyed by the rain-fall depends, not alone on the quantity of rain, nor upon the depth to which the soil is stirred, but mainly on the texture of the soil, and the elevation and incline of the lands. We have little doubt that on the great proportion of the cultivated soils in wet districts in Scotland, the amount of fertilizing elements removed by the rain-water is much greater than that removed by the system of cropping pursued—that is, by a portion of the crop being sold off the farm, and the straw and turnip converted into manure and returned to the soil. It may therefore be held

that the deeper the land is stirred, the application of the elements of fertility must be increased. There is no doubt that the principle of garden culture applied to the great portion of the cultivated fields, must rest on this basis. There are soils so rich in the elements of fertility, that the comparatively exhausted surface soil can be advantageously replaced by the subsoil; but such soils are very exceptional, and may be safely dismissed as not interfering with the principle we have indicted. The farmer will be most successful who expends capital in improving the manurial condition, rather than by increasing the depth of the soil stirred. With both conditions secured, heavier crops, and of a more uniform character, will be raised; but as his object is mainly profit, it is by obtaining the largest return for his capital employed, and not by raising the heaviest crops, that his object is secured.

In carrying out all operations connected with the cultivation of the soil, the question of profit and loss is the proper standard by which to test every suggestion. At present there is almost a passion in favor of deeper cultivation of the soil. It is therefore wise for farmers to weigh deliberately the *pros* and *cons* of the question.

The following enumeration may include a division of soils which, with certain directions observed, it may be found profitable to stir to a greater depth than previously:—Soils naturally deep, whether friable or retentive, which rest on a comparatively retentive subsoil. Perfect drainage is, however, one of the conditions which must be first secured. When deeper stirring is carried out, the amount of manure applied requires to be increased; the increase depending upon the natural fertility of the soil, and the mode of cropping followed. Soils which should not be deeply stirred:—light sandy, gravelly, calcareous, peaty, and vegetable soils generally, resting on subsoils of a character similar to the soil. Such soils should only be stirred deeper when substances are applied to improve their texture, such as clay, marl, lime, &c., but the depth to be stirred of the previously undisturbed soil should be inconsiderable at first, and, if deemed necessary, gradually increased. Where the subsoil is very porous, great caution should be used.

Increased manurial application is even more necessary for the profitable cultivation of such soils than those of an argillaceous nature. We may afterwards consider the question of stirring the subsoil, with the view of rendering the cultivation of certain soils more profitable.

EXHAUSTION OF THE SOIL.

I wish to bring before this meeting a few facts which have come under my own observation, which tend to show the necessity of bringing the

light of science to bear upon agriculture, and prove the correctness of the theory, which Dr. Hodges has long sought to impress upon this society, namely, that the soil cannot produce, or build up plants, unless it contains the ingredients of which such plants are composed. The soundness of this opinion is strikingly exemplified in the neighborhood of Loughgall, county Armagh, where the soil belongs to the class of sandy loams, and rests upon a limestone formation. This land was formerly considered by many to be the best in Ireland; indeed, so celebrated was it for fertility, that it was denominated "The Garden of Ireland," and a portion of the district towards Kilmore is still called "The Honey Pot," to indicate its extreme richness. Latterly, however, this once fertile soil has been becoming less productive, and the year 1859, the wheat, in many instances, was comparatively worthless. In 1860 it was a little better, but still inferior to that in the surrounding districts, which were formerly considered unfit for the production of that valuable cereal.

Having been engaged in the wheat trade myself for more than twenty years, I observed this gradual deterioration in the quality of the grain sent to market from the district in question, and latterly tried to avoid buying any from the neighborhood, believing that the quality could not be good. Observing these things, I became convinced that the soil was being exhausted of some elements necessary for the proper development of plants, and to test the correctness of this conclusion, I procured a sample of the soil upon which inferior wheat had grown, and had it analyzed by Professor Hodges, and the result will show that this once fertile soil—this garden of Ireland—is fast approaching to barrenness, and unless a more skillful mode of husbandry be adopted, it will soon be unfit for profitable cultivation.

Composition of 1,000 parts—	Fertile soil.	Barren.	Lough-gall.
Organic matter	97	40	81
Silica	648	778	785
Alumina	57	91	72
Lime	59	4	2¼
Magnesia	8½	1	1¼
Oxyd of iron	61	81	In alumina.
Oxyd of Manganese	1	½	....
Potash	2	trace.	trace.
Soda	4	....	....
Chlorine	2	....	....
Sulphuric acid	2	....	....
Phosphoric acid	4½	....	....
Carbonic acid	40	....	....
Loss of moisture	14	4½	58½
	1,000	1,000	1,000

Now, by comparing the analysis of the Loughgall soil with that of the barren soil, they will be found to be nearly identical; and by comparing the composition of the Loughgall and the fertile soils, it will be seen that the former is mainly deficient in alkalies and acids, and as the crops generally cultivated contain a large proportion of these deficient ingredients, it is clear that they cannot be perfected without them. Professor Cameron shows that the ashes of the following plants contain, in 100 parts (I only note the ingredients which are deficient in the soil):

	Turnips (Swede.)	Wheat grain).	Hay.	Oats (grain).
Potash	39.82	29.51	20.80	31.56
Soda	10.86	10.61	10.85	
Lime	12.75	.99	8.24	5.32
Magnesia	4.68	10.60	4.01	8.69
Sulphuric acid	13.15	.09	2.11	....
Phosphoric acid	6.69	47.55	30.61	49.19

Whence, then, are these essential elements to be derived, seeing they are not to be found in the soil Some of them, it is true, may be extracted from the atmosphere in limited quantities; and it is evident that the crops in the district in question, are greatly dependent upon that scanty and precarious supply for their sustenance. For, in the late very dry season of 1859, when there was not sufficient rain to convey from the atmosphere the indispensable ingredients which were not contained in the soil, the wheat mildewed, withered, and died; whereas, in the following year, there was abundance of rain, which carried a partial supply of nutriment to the plants, and prevented them dying of starvation. This, in some degree, accounts for the remarkable fact before referred to, that, in 1859, the wheat in the neighborhood of Loughgall was universally bad, while in the surrounding districts the quality was excellent, although the yield was not very abundant, while the whole country suffered equally from drought.

Professor Johnston shows that a rotation of crops, similar to that alluded to above, carries from the soil—

Potash	281	pounds.	Silicia	218	pounds.
Soda	130	"	Sulphuric acid	111	"
Lime	242	"	Phosphoric acid	66	"
Magnesia	42	"	Chlorine	39	"
Alumina	11	"			

Now these materials have been carted off many farms from year to year, in the shape of potatoes, turnips, wheat, clover and oats, have been but partially restored by a limited application of farm-yard manure; consequently the soil has become exhausted, and its cultivation unprofitable.

The foregoing facts I look upon as practical illustrations of Baron Liebig's theory, and a remarkable fulfillment of his prediction. In the *Belfast Mercury* of 29th December, 1859, he is reported to have said:—"A child can comprehend that a very productive field, in order to remain very productive, or even simply productive, must have the elements which have been withdrawn in the harvests perfectly restored—that the aggregate of condition must remain in order to produce the aggregate results; and that a well, however deep it may be, which receives no supply of water, must in the end become empty, if its water be constantly pumped out." Again, speaking of the economizing of manure, he says: "It is clear that if these elements were collected without loss, and every year restored to the fields, these would then retain the power to furnish every year to the cities the same quantity of corn. And it is equally clear, that if the fields do not receive these elements, *agriculture must cease.*" In corroboration of this, Professor Hodges says, as reported in the *Journal* of February, 1860: "Science teaches us that even the more fertile field is not inexhaustable; that the most productive soil contains only a limited amount of the materials which the plant can mould into wheat, or potatoes, or turnips; that every plant grown by the farmer requires at least eight substances to be supplied by the soil for its development. And it follows, that if our farmers, year after year, in their crops and cattle, sift out as it were, mainly five or six of these necessary constituents of the soil, the work of production, after a time, *cannot go on.*" Now, although the members of this society may be quite conversant with the above theory, there are many farmers who are not so. For respecting the great failure of wheat in 1859, I have heard it said by persons from the district in which it occurred, that "there was a shower of honey in that neighborhood which spotted the straw, and the wheat did not fill afterwards." Now, this spotting of the straw was, I think, caused by the want of mineral matters in a soluble state, to give it sufficient stamina. Others say, "the ground is too rich, and sends out too much straw, which lies down, and the wheat does not fill." Now the land may be too rich in some respects, but the analysis shows it is miserably poor in others, and, unless a proper proportion of the deficient elements be supplied, the soil cannot be restored to its former state of fertility. Again, others say, "the land is wheated out and requires rest." And this is probably pretty near the truth, as rest would certainly improve the exhausted land. But resting land is too slow a process for these stirring times—particularly as the landlord and tax-gatherers cannot be induced to rest at the same time, but must have their several demands satisfied. Therefore it is much wiser for farmers to avail themselves of the information afforded by this and similar societies, which will enable them skill-

fully to use the abundance of ingredients placed within their reach, and supply the soil with such substances as it requires, than to lay their fields out for years, to collect from the atmosphere what might be supplied to them in a few hours. And it is manifest, that if the present system is pursued much longer, the predictions of Baron Liebig and Professor Hodges will, in many cases, be fulfilled, viz: "Agriculture must gradually cease;" the work of production "cannot go on."

MEMORANDA.

If the power to absorb water possessed by a stiff and pure clay be taken at 70, the absorptive power of a clay loam may be put down at 50, of chalk at 45, of loamy land 40, of calcerous sand 29, pure sand 25. The power of soils to absorb water is nearly a correct index to, or in proportion of, the power to retain water. Nitrate of soda is rapidly getting into favor as a top-dressing for the cereals. For oats it is especially valuable. Applied to wheat, it increases the yield both of grain and straw. Salt can be added, however, to the soda, not only with no loss of effect, but, on the contrary, with a gain. We ourselves have had as marked an increase of produce by using a mixture of salt and nitrate of soda, in equal proportions, as when we used nitrate of soda alone.

Dr. Vœlcker's analysis of nitrate of soda is as follows:

Moisture....	1.87	Sulphate of soda.............	1.17
Pure nitrate of soda..........	95.68	Sand.........................	0.49
Chloride of sodium...........	0.79		

In 100 parts of the grain of wheat there are 23.72 parts (12.44) of potash.

CHLORIDE OF LIME.

In scattering chloride of lime on a plank in a stable, all kinds of flies, but more especially biting flies, were quickly got rid of. Sprinkling beds of vegetables with even a weak solution of this salt effectually preserves them from the attacks of caterpillars, butterflies, mordella, slugs, &c. It has the same effect when sprinkled on the foliage of fruit trees. A paste of one part of powdered chloride of lime and one-half part of some fatty matter, placed in a narrow band round the trunk of the tree, prevents insects from creeping up it. It has even been noticed that rats and mice quit places in which a certain quantity of chloride of lime has been spread. This salt, dried and finely powdered, can, no doubt, be employed for the same purposes as flour of sulphur, and be spread by the same means.

FOOT-ROT IN SHEEP.

A specific against this disease has just been discovered by M. Bauchiere, of Toulon, and considered by the Minister of Agriculture and Commerce to be of sufficient importance to warrant his sending M. Renault, Inspector General of the Imperial Veterinary Schools, and several other gentlemen, on a mission to verify the efficacy of this new remedy. The *Moniteur* now publishes the report of this commission, from which it appears that they visited the farm of Bois-Vert, in the commune of Aries, where they found a flock of about 1200 sheep of the Merino breed, nearly all of which were attacked with foot-rot, some to such a degree that they could no longer stand, but crawled along on their knees. Fifty of these sheep were selected by the commission, and operated upon by M. Bauchiere; while 24 others, divided into 3 lots of eight each, were treated according to three different methods in common use, viz: 1. Verdigris and vinegar; 2. Tar, essence of turpentine, hydrochloric acid, and sulphate of copper; and, 3. Calcined alum and sulphuric acid. M. Bauchiere's treatment consisted in rapidly cutting away all the parts of the hoofs which had become detached by suppuration, taking care to draw no blood during the operation. He then wiped the suppuration from the sore, moistened it with a brush dipped into a brownish liquid he had at hand, and then powdered it over with a white substance. Five days after the operation the sheep treated by M. Bauchiere were found to be cured, while those subjected to the other three methods were still in a diseased state, though progressing favorably. M. Bauchiere's specific is still a secret, but will no doubt be published.

DISEASED PORK, AND MICROSCOPIC WORMS IN MAN.

BY JOHN GAMGEE,

PRINCIPAL OF THE NEW VETERINARY COLLEGE, EDINBURGH.

Did Moses know more about pigs than we do? Was it a knowledge of the parasitic diseases common to man and swine which led the father of the Jews to condemn pork as human food? Both questions can be answered in the negative; and the apparently slender grounds on which pigs were first regarded as unclean are stated in the following verse: "And the swine, because it divideth the hoof, yet cheweth not the cud, it is unclean unto you: ye shall not eat of their flesh, nor touch their dead carcase." The wisdom of the Mosaic law can only be justly estimated with a knowledge of the accidents arising in warm countries from eating pork throughout long and hot periods of the year; and there is no doubt that the direct evil results as manifested by human sickness led to the exclusion of pork from the list of Israelitish viands. The masses of measly pork which may be seen hanging from the butchers' stalls in Southern Europe prove that the long-legged swine which hunt the forests for acorns, and rove about to pick up all kinds of offal, are often unfit for human food; and that they were so to no less extent in the land of Israel is probable. There are those who fancy that domesticity breeds disease—that improving the meat-producing powers and hastening the growth of our live stock renders it liable to disorders of a malignant type—no greater fallacy! The parasitic maladies which are bred for man in the systems of the animals we eat are most common in the quadrupeds allowed to rove about in search of food, and which living amongst men and animals, have every opportunity of meeting with the germs of the worms which prey on them. The animalcules which burrow and breed in the human frame are not, as the ancients believed, the results of an agglomeration of *unhealthy humours* becoming vitalized when perfected in form. The advocates of the spontaneous generation theory are now few and far between, and the development of the lower forms of animal life in apparently inaccessible regions of the human frame, only affords an illustration of how wonderfully every precaution is taken in the

ordinary routine of Nature's works to prevent the extermination of the smallest and apparently most useless of living creatures. The wisdom of creative design is not easily fathomed when we see the higher orders of animals, and man himself, perishing in order to afford food and a means of propagation to the marvels of organization which appear to us always obnoxious and destructive—born for evil, and not calculated to play in this world's *role* any other than an offensive part.

It is interesting to observe that parasitic maladies in the pig specially abound in that section of the United Kingdom where swine live most amongst human beings. The Yorkshire and Berkshire pigs, in their native counties, enclosed in the farm-yards of their breeders, are free from worms which are likely to live in the body of man. The Irish pig is the one most commonly injured by entozoa, and the reason for this is evident when we know how much the cottager relies on rearing a porker which is permitted the free range of house and road, where every description of filth is devoured, charged with the ova of parasites expelled by man, or some of the lower animals. The observations of helminthologists prove that it is not unattended with danger for human beings to sleep together when one is affected with tapeworm or trichina. How much more dangerous, then, for animals to live with people who disregard all habits of cleanliness! Though we may ridicule the notion that filth breeds parasites, we must not forget that dirt protects the ova, and secures their transmission from one nest to another. The terrible hydatid disease, which is the direct cause of one-fifth of the human mortality in Iceland, is due to negligence and dirt. The Icelanders slaughter their animals, and leave the offal to decompose. Dogs naturally devour the entrals, which abound in entozoa, and, breeding tapeworms within them, disseminate eggs over the whole country, so as to ensure the development of bladder-worms in the internal organs of the herbivorous quadrupeds, which the people eat. The conditions under which we live in the British Isles are certainly much less favorable to the propagation of worms; but we disregard, in our ignorance, the most common precautions to protect ourselves from loathsome diseases, and not only permit dogs to eat any kind of offal in and around slaughter-houses, but sanction the existence of piggeries where all kinds of garbage, charged with worms or their eggs, are daily devoured by swine. The majority of germs calculated to engender parasites are to be found in abundance in the contents of the alimentary canal of human beings and domestic quadrupeds. If pigs are permitted to eat these, as in Ireland or in many British piggeries, we must expect hams, bacon, and pork sausages, to be charged with the embryonic forms of human entozoa. Whereas, in Iceland, then, the dog

is the victim of human negligence, and *en revanche* the cause of human disease, in the British Isles the pig holds this unenviable position; the more however we learn of parasitic disease in man, the better we can understand how even the underdone roast beef of Old England may prove to us poison as well as food, and how the dog or cat we pet may indirectly shorten our days. We have good reason to believe with Moses that the pig is an unclean beast; but without discarding him from the scanty list of animals to be eaten, it is evident that we can purify the race of swine, and thus prevent human as well as porcine maladies.

Having thus drawn attention to the general causes operating in the production of parasitic affections, a brief reference to the most important of those common to human beings and the pig may not be devoid of interest. I wish to refer more especially to the one least understood, and which is occasionally attended with fatal results—viz., trichinous disease in man and animals.

Though Mr. Hilton, demonstrator of anatomy at Guy's Hospital, and Mr. Wormald, at St. Bartholomew's, had repeatedly noticed a peculiarly speckled condition of the voluntary muscles of the human frame prior to 1835, it was only in the month of February of the latter year that Professor Owen first described the smallest of human parasites, which we now know to be common, and to exist, as Owen first said, in "astonishing numbers." The case which afforded Professor Owen the opportunity of securing for this country the honor of one of the most brilliant discoveries in helminthology, was observed by another of our distinguished countrymen, Mr. Paget. It is not a little remarkable that we should owe to the Germans the history of the parasite before it reaches the human system; though this is a direct result of the intelligence and earnestness with which Küchenmeister and his followers have carried out so-called "feeding experiments," whereby they have determined the origin of human parasites, and the identity of entozoa seen in different animals under such a variety of forms, as to have led to each form being considered a distinct species, whereas it was only a stage of a singular metamorphosis. In 1852 Herbert fed three dogs with the trichinatous flesh of a badger, and found the parasites in the muscles of these dogs. Some of the first feeding experiments to trace the origin of trichina in man, were performed in Edinburgh, by the members of the Physiological Society, whose labors were of too short a duration. Specimens of the parasite were shown to the Society on the 19th of March, 1853, by Dr. W. T. Gairdner, who, with his usual acuteness, declared that the whole appearance of the parasite was such as seemed strongly to bear out Owen's view, that the trichina was merely the first stage of an animal destined for further development. Dr. Gairdner

thought it very probable that the muscle was only the hot-bed of ova, which, for their development into perfect animals, required some other habitat. Considering it to be not unlikely that this further development of trichina might take place in the intestinal canal of some carnivorous animal, Dr. Gairdner sent some of the specimens exhibited, in the fresh state, to Mr. Barlow, who administered portions to dogs and cats; and I learn from Dr. Mercer Adam that the result of the experiments was as anticipated by Dr. Gairdner. The results were not published, and we owe to continental observers and to Mr. Turner, of the Edinburgh University, interesting information as to the propagation of the parasite.

Professor Owen's first description is in many points complete. In his paper communicated to the Zoological Society of London he says: "With a magnifying power of an inch focus the white specks in the muscles are seen to be cysts of an elliptical figure, with the extremities in general attenuated, elongated, or more opaque than the body (or intermediate part) of the cyst, which is, in general, sufficiently transparent to show that it contains a minute coiled-up worm. On separating the muscular fasciculi, the cysts are found to adhere to the surrounding cellular substance by the whole of their external surface, somewhat laxly at the middle dilated part, but more strongly by means of their elongated extremities, so as to render it generally a matter of some difficulty to detach them. When placed upon the micrometer they measure 1-50th inch in their longitudinal and 1-100th inch in their tranverse diameter; a few being somewhat larger, and others diminishing in size to about one-half the above dimensions, They are generally placed in single rows, parallel to the muscular fibres, at distances varying from half a line to a line apart from one another; but sometimes a larger and a smaller cyst are seen attached together by one of their extremities, and they are occasionally observed slightly overlapping each other. If a thin portion of muscle be dried and placed in Canada balsam, between a plate of glass and a plate of talc, the cysts become more transparent, and allow of the contained coiling-up worm being more plainly seen.

"Under a lens of the focus of half an inch, the worm appears to be inclosed within a circumscribed space of a less elongated and more regular elliptical form than the external cyst, as if within a smaller cyst contained in the larger, like the yolk of an egg surrounded by its albumen and shell. The worm does not occupy more than a third part of the inner space. A few of these cysts have been seen to contain two distinct worms; and Dr. A. Farre, who has paid much attention to the subject, has shown me

a drawing which he made of one of the cysts containing three distinct worms, all of nearly equal size.

"The cysts vary in form as well as size, being more or less elongated, and the opaque extremities being further extended in some than in others in a few instances only one of the extremities is thus produced. Occasionally the tip of one of the extremities is observed to be dilated and transparent, as though a portion of the larger cyst were about to be separated by a process of gemmation."

The coiled parasite is seen in the centre figure of the annexed plate,* and the peculiarities of the worm are well brought out from the imbibition of an ammoniacal solution of carmine—a method of preparation which often enables us to trace the characters of microscopic objects which are otherwise ill defined. The body of the parasite is seen clothed with a transparent skin, which does not imbibe the carmine so readily as the softer structures within. The thickness of the skin has been estimated by Leuckart at 0·001dth millimetres. Attention has been drawn by Henle, Luschka, Küchenmeister, and others, to the wrinkled appearance of this skin, which in all perfect specimens is smooth, and not convoluted. Leuckart says that when the parasite is injured, rings round the body are commonly visible. The skin is structureless. Beneath the skin is a layer of fine granular matter with the appearance of longitudinal stripes and numerous bright refrangent corpuscles. This has been looked upon as the muscular structure of the trichina.

From the cutaneous muscular structure there are two bands, or water tubes, stretched from before backwards on the lateral part of the body. The centre pale, but with well defined outlines, and striated alongside of them are small round or oblong yellow corpuscles.

The alimentary canal extends through the whole body from the narrow end or head to the broad anal extremity. The organs of generation do not appear in the encysted worms, and only when they attain their full development in the alimentary canal of their host, though the females are distinguishable from the males even in the capsule.

Without entering into further details as to the worm, it is important to notice the capsule that surrounds it, and which consists of the thickened sarcolemma, and a special envelope for the capsule within this. Leuckart has demonstrated that the trichinæ lead to the removal of the muscular tissue, and are really living in the muscular fibre itself. They are therefore not, as some persons have supposed, in the areolar tissue between the muscular fibres; and the fact of their existence in great numbers occupying the place of the active muscular element, explains symptoms in marked cases of trichinous disease.

* The plate is omitted.—Klippart.

From a report in a German veterinary periodical, to the effect that trichinæ could live in roots, and that the domestic quadrupeds derived them from rotten turnips, which abound in trichinæ, I have taken some pains to ascertain if any truth existed in such statements. I find that a species of anguillula preys on the turnip, and is found coiled up in cells much like the trichina; but it is altogether a different parasite; and having fed two pigs on such turnips, I obtained negative results.

At one time it was supposed that trichinæ, as found in the muscles, were the larvæ of a tricocephalus; but the experiments of Virchow, Leuckart, and others, show that the fully developed trichina is a distinct filiform worm, occupying the alimentary canal, and giving birth to young trichinæ, which pierce the walls of the intestine, and on reaching the muscles become capsulated. The appearance of the muscle is well shown by the specimen drawn in the annexed plate;* and as the recognition of the disease in the lower animals is the best means to prevent the malady spreading to man, I may now refer to the symptoms manifested by pigs, dogs, cats, rabbits, and other quadrupeds.

The symptoms have been ascertained in the course of experiments, and they are found to vary somewhat in different cases. Not uncommonly rabbits, which are made to swallow thousands of trichinæ, appear to suffer no indisposition for some days, and then die suddenly. Leuckart fed nine rabbits with half an ounce of muscle, containing about 160,000 trichinæ, and repeated the dose about three days afterwards. No symptoms of importance resulted until the seventh day after the first administration, when one of the rabbits died. After death, the diaphragm and the serous coat of the intestine were of an intensely red color. Exudations had occurred from the mucous membrane, on which numberless trichinæ with their embryos were found. Leuckart and Claus then traced the embryos on the peritoneal coat, having therefore forced through the intestine, and many were also found in the pleural cavities. None could be traced in the blood of the mesenteric vessels. Leuckart also traced the parasites in the red spots on the peritoneum, which evidently indicate the parts where the parasites were burrowing.

In the pig, thousands of trichinæ may exist without affecting the animal's health; though commonly, at the period of migration from the alimentary canal to the muscular system, there is diarrhœa, lassitude, and a general feverish state. These symptoms may be so severe as to kill, or may pass off; and either the animal lives on with trichinæ in its flesh, which afterwards die and cretify, or within a fortnight or a month there is evidence of pain, stiffness in movements, languor, debility, and death.

---

* The omitted plate referred to on the previous page.—Klippart.

What we see in the lower animals has been witnessed in man, and cases are accumulating so as to teach physicians how to diagnose the trichinæ in the living subject.

The early reports of such cases in this country revealed such complications, that the trichinæ have been looked upon as harmless occupants of the muscles of diseased or healthy human beings. The cases reported by Professor Owen belong to this class; and whether the death of the sick people whose histories are given was hastened or not by the trichinous disease, we are left to conjecture. I am inclined to think that the muscular parasite is, to say the least, a dangerous complication, as in the following instance. Dr. Bellingham reports that Bernard Macauley (æt. 67), a laborer, was admitted into St. Vincent's Hospital, December 20, 1851. He had for several years suffered from cough and oppression of his breathing. A fortnight ago, he says he was attacked with severe pain in the left side after exposure to cold. On examination, signs of bronchitis and emphysema of the lungs were evident; in addition, there was dulness, which indicated much fluid. The breathing was much oppressed, and the patient much debilitated. He gradually became worse, and died on the fifth day after his admission. On examination, the lungs were emphysematous, the bronchial tubes loaded with mucous, the left pleura was coated by lymph, and about a pint and a half of very fetid pus was contained in its cavity. The most remarkable point, however, connected with the case, was the presence of an immense number of the cysts of the *Trichina spiralis* in the voluntary muscles, particularly in the pectoralis major and minor upon each side, in the sterno-mastoid, sterno-thyroid, and omo-hyoid muscles upon both sides. When these muscles were exposed, they had the appearance of being dotted over with innumerable minute white specks of an oval or elliptic form, the long diameter corresponding with that of the muscular fibres; these, on examination, proved to be cysts of the *Trichina spiralis*.

Fatal cases have been reported by Continental observers. Thus, Professor Zenker, of Dresden, mentions that, among 136 post-mortem examinations which he made during eight months of the year 1855, he found four subjects evidently affected with trichina. He gives in detail the case of a farm girl who died under his observation in 1860, killed by trichinæ. She had a month before been taking part with the other farm servants in a particular pig-sticking, and in the consequent processes, and had probably (according to what is said to be not a very unusual practice) taken an occasional pinch of the sausage-meat which she had to chop. She soon fell ill, and died in five weeks. Her bowels contained swarms of adult trichinæ, and the voluntary muscles throughout her entire body were

colonized by myriads of larvæ. It appeared, on inquiry, that other persons who took part in slaughtering the same pig also suffered, and that, though none died, two were bed-ridden for weeks. Microscopical examination of products which were remaining of the slaughtered pig—ham, sausages, and black-puddings—showed in them innumerable dead trichinæ. In July, 1863, a paper was published by Dr. C. Tüngel, of Hamburg, giving particulars of a case in which certainly one death was caused, and perhaps also a second death, as well as some not fatal illness, by the consumption of trichinous pork on board ship. Of the two deaths, one occurred on the 24th, the other on the 27th day after that on which the pig was slaughtered and the consumption of its flesh begun.

In the last number of the *Edinburgh Medical Journal* similar instances are recorded, and, no doubt, ere long science will be enriched by a host of facts that prove that trichinous animal food is a danger to be very carefully avoided.

I have gathered together the facts and observations in this brief article to demonstrate the precise nature of the relation between troublesome, dangerous, and even fatal parasitic diseases of human beings and swine. There are those who consider that we must trust to good cooking to prevent such diseases. I consider it just as reasonable to trust to cleanliness and ventilation to prevent human small-pox. There can be no doubt that care and cleanliness have a tendency materially to diminish the chances of contagion; but as for some wise end, no doubt, contagious diseases present the same determined tendency to reproduction that we notice in the multiplication of parasites, and as our first concern in relation to such maladies as small-pox is to destroy the poison or to combat the virulence of that poison by rendering the human frame but little susceptible to its deadly influences, should we aim primarily at the extermination of the parasites in the animals we eat.

REPORT ON FEEDING SHEEP IN THE OPEN FIELD AND IN COVERED PENS OR BOXES.

By Mr. James B. Bird, Renton Barns, Grant's House.

[Premium—The Gold Medal.]

In submitting this report, the reporter thinks it preferable to give, first, a minute detail of how the experiment was conducted; next, a statement of the result; and lastly, a few remarks expressive of his own opinion regarding it.

The twenty sheep with which the experiment was made were selected from a flock of hoggs mostly three parts bred, viz.: once from the Cheviot and twice from the Leicester. They were divided into four lots of five each, and, after being carefully weighed, were put on to and continued eating white-globe turnips all the time allowed for making the trial, viz.: from the 14th November, 1856, till the 14th March, 1857.

Two of the lots were folded in the usual way on the field in which the turnips were growing, each lot in an enclosure of about 15 square yards, and receiving a small fresh break when necessary.

One of the lots was allowed 2½ lb. crushed linseed cake per day—that is, half a pound for each sheep—as an auxiliary along with the turnips.

The other lot was allowed turnips alone. On and after the 26th January, both lots had the turnips pulled, rooted, shawed, and cut for them by Gardiner's cutter.

The other two lots were put into houses thatched with straw, and water-tight. Each house was 21 feet long by 8 feet in breadth and 5 feet in height. The walls were of stone and lime, excepting the front, which was open, the sheep being kept in by hurdles, thus allowing them plenty of light and air without undue exposure or draught. Altogether they were remarkably well sheltered, for although the open front faced the east; a range of houses 50 yards distant intervened with good effect against the cold east wind, and a wall 6 feet high sheltered them from the north.

It was found necessary to give them a fresh littering of straw every morning; and the turnips consumed by them were brought from a portion of the same field, and closely adjoining to where the other two lots were folded; and in quality and bulk as a crop were, as near as could be judged, equal.

In good, fresh weather, not more than what were found to be necessary for about a week's consumption were rooted and carted home at a time, so that the sheep might have them quite fresh, and as near as possible in the same condition as the two field-lots—having this considerable advantage,

however, that the turnips they received were always clean, whereas in wet weather those in the field had them very dirty, making a considerable quantity sometimes, by their trampling, unfit for food altogether, and wasted on that account.

The two house-lots eat their turnips out of boxes, and had them given to them whole, shaws and all, till the 26th January, when they, as well as the field-lots, had them cut to them with Gardiner's cutter. One of the lots was also allowed 2½ lb. crushed linseed-cake along with their turnips daily. From their being deprived of the necessary friction of the ground, which seems naturally requisite to keep their feet hard and healthy, and the encouragement given them by their standing constantly amongst the soft, warm straw, to become soft and long in the digitals, it was found necessary to pare them once during the four months to prevent foot-rot.

STATEMENT OF THE RESULT.

	Weight of each Lot, Nov. 14, 1856.	Weight of each Lot, Mar. 14, 1857.	Amount of Weight gained, at 8d. per lb.	Quantity and Value of Turnips consumed by each Lot, at L. 6 per acre.	Weight and Value of Linseed-Cake consumed by each Lot, at L. 10 per ton.	Cost of Labor and Attendance on each Lot.	Amount of Profit or Loss, after deducting cost of Food, Labor, &c. Profit.	Loss.
	st. lb.	st. lb.	st. lb.	sqr. yds.	stones.	L. S. D.	L. S. D.	L. S. D.
No. 1, Lot of Five Sheep fed under Cover on Turnips and Linseed-Cake..	30 7	36 9	6 2 £2 17 4	1417 £1 15 1½	20½ £1 5 7	0 9 7		0 11 11½
No. 2, Lot of Five Sheep fed in the Field on Turnips and Linseed-Cake.	30 11	41 5	10 6 £4 17 4	1579 £1 19 1½	20½ £1 5 7	0 4 6	1 8 1	
No. 3, Lot of Five Sheep fed under Cover on Turnips alone	32 0	34 11	2 11 £1 6 0	1417 £1 15 1½		0 9 7		0 18 8½
No. 4, Lot of Five Sheep fed in the Field on Turnips alone	31 3	37 1	5 12 £2 14 8	1656 £2 1 0½		0 4 8	0 8 11½	

It will at once be seen by this table that the experiment tells very much in favor of feeding sheep in the ordinary way on turnips in the field, in preference to feeding them under cover, from the field-fed lots there being left a considerable profit, especially from the five sheep that received linseed-cake along with their turnips; whereas on the house-fed lots there is shown a dead loss of 11s. 11½d. on the five that received linseed-cake

along with their turnips, and 18s. 8½d. on the five which received turnips alone.

The expenses for labor and attendance may appear comparatively great on the two lots fed under cover, but as the turnips consumed by them were all carted home from a considerable distance, accounts for the difference.

The expenses, indeed, for attendance on all the lots are rather beneath what they really were, it taking as much time to travel between small separate lots as whole flocks. But the writer, taking that into consideration, has calculated the expenses marked in the table against each lot for attendance—such as looking after, shifting nets, hurdles, &c.; picking and cutting turnips to those in the field; littering, hand-feeding, and cutting turnips to those in the house—more as to how many one man could really manage to feed and look after, than as to what time was really spent in feeding and attending to twenty.

He considers that one man at 2s. per day, if he does his duty, is fully qualified to attend on, carry litter, and cut turnips to ten scores of hoggs feeding under cover, provided the houses are conveniently situated.

Feeding in the field, one man may manage to look after, shift nets, and pick turnips to twenty scores, or cut and carry to twelve scores of hoggs.

The wool also of the house-fed lots seemed very inferior in quality; and were they now shorn and the fleeces weighed, the writer feels assured that he would have to report here a deficiency also in weight from the fleeces of the two lots fed in the field, which in quality and quantity seemed quite superior.*

Some deduction ought also to be made from the two house-fed lots, for a probable deficiency in the ensuing crop of grain sown on the land whence the turnips used by them were removed. No doubt the manure made by them under cover, if impartially spread over and ploughed into the ground, would materially aid in counteracting the impoverishing effect of leading all the turnips off; but it must be taken into account that a considerable expense attends the carting of dung to any considerable distance, as also a little in getting it well spread; and on light, or even on moderately light soil, it can never have the same good effect as when the turnips are consumed by the sheep being folded on them in the field. For, independent of the manure left by them, the soil, by the treading of their feet, is left in a consolidated state, which, when ploughed, well harrowed, and rolled, not only proves itself much more capable of producing an abun-

* Weight of Wool shorn off the different Lots about the end of May, 1857:—

No. 1.—Clipped	37¼ lb.	No. 3.—Clipped	31¼ lb.
No. 2.— "	41¾ "	No. 4.— "	33¾ "

dant crop of grain, but, to appearance, is altogether left in a much higher state of cultivation.

But as many varieties of soil make many different opinions, the writer thinks it preferable to leave practical agriculturalists to determine for themselves what should be deducted for a probable deficiency in the ensuing crop. He, in endeavoring to report impartially, has thought it necessary merely to call attention to this, as being, in his opinion, one great objection to the feeding of sheep under cover, even although it could otherwise be done profitably, omitting to put anything down for it in the table as a deduction, as he could only have done so at random, and might be thought incorrect in his estimate, placing nothing there but what he has practically proved by experiment; and from it there seems little ground or encouragement to hope for success in feeding sheep in this way with profit, there being no reasonable approximation of profits whatever in the two ways of feeding.

Had the sheep had open enclosures to walk about in, as well as houses in which to retire and feed at pleasure, very probably they would have thriven a great deal better—for although they did not seem to mind the confinement at all when they were first put under cover in November, eating as regularly and plentifully as those in the field, yet when the days began to get long and fine towards the end of February, they seemed very anxious to get out, and eat a considerably smaller quantity of turnips, although they then had them cut to them with Gardiner's cutter. During the two weeks in March, before being weighed, they consumed about one-third less of turnips than the two field-lots, the long confinement seeming gradually to lessen their appetite. But even supposing that, by the addition of open enclosures to covered boxes, sheep in that way could be fed with a profit—say even a greater profit than from those folded in the field—independent of the objection already taken notice of, of impoverishing the ground by the removal of all the turnips, there are several other drawbacks which must leave it very doubtful whether the feeding of sheep in houses can ever really usefully and profitably be carried into general practice. 1st, There would require to be a considerable outlay of capital to erect the necessary houses and enclosures, the cost of which at the very first, in most of cases, would devolve on the tenant, or where it did not do so, at least an addition to his annual rent would be requisite as payment of the interest of the sum sunk by the landlord on buildings which might ultimately turn out to be of no real benefit to either of them. 2d, It would require a considerable addition of hands to pull, root, and fill all the turnips into the carts—more than would be at all requisite for the other labor of the farm, so that when the weather was fine there might be

no lack of strength to get in a supply; there being in some winters weeks together when it is quite impassable from frost, snow, or rain, to pull and cart turnips in the way that work ought to be done. Now, one question would be, Where could these additional hands be obtained? for many of the farmers in Berwickshire, at least, can scarcely at present find the number absolutely requisite to pull and root turnips for their cattle, besides the other ordinary work, such as thrashing, winnonwing, &c. For some months in winter, more horses would also be required to cart the turnips home to the sheep, and at the same time keep forward the other departments of the horse labor. 3d, It would often be a very difficult matter getting so many turnips led off without souring the soil, although there are some fine winters in which it would be an easy task to do so. Yet, taking them in general, a good deal of rain or snow falls for some months at that time, making the fields often quite unfit for being much carted upon, without a great amount of injury being done to them.

Weighing, then, all these objections to feeding sheep under cover, fairly and impartially coupled with the result of the practical experiment already detailed, the writer cannot avoid thinking that the ordinary method pursued feeding them folded on breaks, and getting the turnips cut to them in the field, is much to be preferred.—*Jour. of Agriculture of Scotland.*

EXPERIMENTS ON FEEDING TWO KINDS OF LEICESTERS.

By John M'Laren, Rossie Priory, Inchture.

[Premium—£10.]

At the discussion in Edinburgh as to the advisability of having two classes of the Leicester sheep at shows of the Highland and Agricultural Society of Scotland, a question was raised as to which of the kinds of Leicesters, the White or Border, or the Blue or English, was the most profitable. In other words, was it ever ascertained by actual experiment whether, as stated, more sheep of small-boned and finer kind could be kept on the same amount of food than could be of the larger kind; and whether the small, although when sold not worth so much as the large, the proportion as to profit might be more evenly balanced, as per acre of land, than the selling prices of each seemed at first to warrant? Lord Kinnaird then proposed to undertake a set of experiments to try this. The following report is the result of this trial:

After due consideration as to the best means of carrying out this experiment fully and fairly, and on a good foundation, his lordship put himself

into communication with Mr. Sandy, of Home Pierrepoint, as to the English Leicesters, and with Mr. Usher, Stodrigg, as to the Border Leicesters. We were very much indebted to those gentlemen for the trouble they took in furnishing us with their advice and assistance in getting the best specimens of both kinds of Leicesters. Having determined to carry on the trial from the time they were lambs, Mr. Sandy procured for us ten wether lambs from Colonel Inge, near Tamworth, and Mr. Usher also got for us ten wether lambs from Mr. Hardie, near Kelso. Although the experiment rests mainly between the above two lots, still Lord Kinnaird wished it somewhat more extensive, and ten wether lambs were selected from our own Leicester flock, and also ten wether lambs from our flock of grey-faced Cotswolds. This, though adding to the expense, also added to the experience, and gave nearly full work to the person in charge of all the weighings and measurements of food, &c. The experiment commenced on the 26th of August, by dividing a piece of rich old pasture into four equal pieces, further divisions being made by means of iron feeding-hurdles, moved four or five times a day, according as required. We thus found out what quantity of grass alone each of the lots consumed in four weeks; all the sheep were weighed at the commencement of experiment, and every four weeks afterwards. The ground thus pastured by each lot was then allowed them for exercise during the winter months of the trial. I may here mention that the necessary confinement of the sheep occasioned us much trouble, owing to their feet becoming sore, which was increased by a very wet season. This sometimes made a very great difference in the progress of all the lots; still, as they shared alike, it only made the value of all the sheep rather less at the end, so it could not interfere much with the results of the experiment.

The second four weeks they had cut clover weighed out to them in troughs, along with oats, cake, and Indian corn; of the artificial substances we regulated the supply to each lot as the animals would eat, thus leaving the more bulky portions of the food—as grass, clover, turnips, &c.—to test the qualities of the different kinds of sheep.

The third four weeks all the lots had turnips cut in troughs, along with hay, chaff, and oats, cake and meal, as formerly; they had turnips and mangolds for eight months, when they returned to clover for part of the eleventh month, and on grass all the twelfth, in the same manner as the first month, with the addition of oilcake. During the trial they were carefully washed and shorn, and the wool of each sheep weighed, marked, and each lot kept separately. It was all sold at the same price, but the merchant said that the wool of the Border Leicesters, in the present markets, was of most value for his purpose, the grey-faced next, and the other

Leicesters about equal. In the following tables we shall confine ourselves to each lot, as the particulars of each sheep for a year would only make a multiplicity of figures; and we think it quite sufficient for the purpose of the trial to show the weight at the commencement of experiment on 26th August, and the weight at the end, on the 25th of August following, along with the weight of wool and price; also the price of the sheep when sold, as against so much grass, turnips, mangolds, hay, corn and cake consumed. Before doing so, however, we shall give the particulars of each lot.

No. 1 consisted of ten wether lambs from the flock of Colonel Inge, selected for this experiment by Mr. Sandy. They were very early lambs, seemingly, and had been accustomed to artificial food before we got them. In fairness we had to allow them a fortnight's rest before commencing; they were, however, all sound. After being weighed they were put on their piece of grass on the 26th of August, their average weight at that time being 86½ lbs. After the first month they did very well, but, owing to causes previously stated, the average gain on each weighing varied or ranged from 4 to nearly 13 lbs. each sheep. The first month we had to put out one, on account of an unfortunate accident by which it got a broken leg, and, to make the lots equal, we also cast one from each of the others, thus reducing the number to nine, which number we carried through all the trial; but some, as previously stated, were from lameness and other causes not sound and well enough to afford a fair criterion of progress. We think, therefore, the best plan is to give the average weight of each sheep in the several lots at the commencement and end, thus making it immaterial whether ten or seven sheep were in the lot.

The average weight of ten sheep on 26th August was 86.5 lbs.; the average weight of seven sheep on the 26th of August following was 156.2 lbs.; gain in live weight, 69.7 lbs.; weight of wool of nine sheep, 68 lbs. 4 oz., which sold for £6, 5s. 1½d. The seven sheep were sold for £20. We may here mention that the sheep of this and the other lots were equally divided—one part sold in Edinburgh, and the other in Liverpool. Total for sheep and wool, £26, 5s. 1½d. The annexed tables will show the amount of food consumed by this lot during the trial.

No. 2 was composed of ten wether lambs, from the flock of Mr. Robert Hardie, Hariotfield, near Kelso, selected for the purpose by Mr. Usher, Stodrigg. They also were allowed about the same time as the previous lot before commencing the trial. This lot had also been accustomed to trough-feeding before, and were a nice lot of lambs; one of them died the first month of the trial, leaving nine to be carried on. They seemed to resist the influence of the confinement and bad weather better than their finer-bred opponents; but even their average gain per four weeks varied

from nearly 5 to 15 lbs. each. This was owing to the causes before stated. The average weight of the ten sheep on the 26th of August was 90 lbs. On the 25th of August following, their average weight was 178.4 lbs.; total gain (live weight) 88.4 lbs. The weight of wool of nine sheep was 69 lbs. 13 oz., which sold for £6, 8s. 0½d. The seven sheep of this lot sold for £22, 5s., making a total for sheep and wool of £28, 13s. 0½d. The tables also give the amount of food consumed by this lot during the trial.

No. 3 consisted of ten wether lambs, bred by Lord Kinnaird from his Leicester flock; and here we may remark that we have almost always used the small-boned blue-faced Leicester, our rams being obtained from Messrs. Burgess, Stone, Sandy, &c.; and our lambs were evidently at least six weeks younger than those of the preceding lots. They also labored under the disadvantage of not having been accustomed to trough-feeding, for the most part having been newly taken off their mothers and confined for the trial; and, as a natural consequence, for the first two months they rather decreased than increased in weight. After that, however, they improved very rapidly, although, as in all the other lots, their improvement varied very much, as from 3 to 13 lbs. each sheep. The average weight of the ten sheep on the 26th of August was 78.8 lbs. per sheep, and at the end of experiment in August following, 149 lbs.; the total gain, live weight, was thus 71.2 lbs. each. The weight of wool of nine sheep was 62 lbs. 2 oz., and sold for £5, 14s. Seven sheep of this lot sold for £19, 5s. Total for sheep and wool, £24, 19s. The food consumed will be found in the tables.

No. 4 consisted of ten wether lambs, bred by Lord Kinnaird out of his flock of grey-faced Cotswolds; and we here take an opportunity of stating our high opinion of this class of sheep—wool, mutton, and quality being largely combined. We are only sorry that we cannot give the *real* result of the trial of this lot, as in the month of February, during the trial, two of the best of the lot were found dead in one morning. They were replaced by others out of the flock, which, however, were not so heavy at the time, and they had the further disadvantage of not being accustomed to the confinement. The average gain in this lot was large, varying from 7 to 18 lbs. each per four weeks. They did remarkably well after this. The average weight of ten sheep on the 26th of August was 95.1 lbs., and the average weight of seven sheep on the 25th of August following was 180.5 lbs.; total gain, live weight, was 85.4 lbs. The weight of wool of nine sheep was 81 lbs. 10 oz., which sold for £7, 9s. 8d. Seven sheep sold for £23, 12s. 6d. Total for sheep and wool, £31, 2s. 2d. The particulars of food consumed are furnished in the tables.

Prices of Food used during Experiment.

Kind of Food.	Colonel Inge.	Mr. Hardie.	Lord Kinnaird's Leicesters.	Lord Kinnaird's Grey-faced.
Grass Pasture	£3 13 3	£3 17 4 3-4	£3 11 8 1-2	£3 15 10 1-2
Clover, Cut	5 2 0	5 6 4 3-4	4 5 6	5 15 1
Turnips	6 3 9	6 19 3 1-2	5 17 10 1-2	7 6 1 3-4
Mangolds	1 0 5 1-2	1 1 2	1 0 3 1-2	1 4 9 1-4
Hay	1 10 2 3-4	1 15 3	1 9 3 3-4	1 17 8 3-4
Indian Corn	0 13 11	0 13 11	0 13 11	0 13 11
Oil Cake	7 5 10	8 2 8 3-4	6 1 1	7 18 7 1-4
Oats	3 15 5 3-4	3 15 5 3-4	3 15 5 3 4	3 15 5 3-4
Total	£29 4 11	£31 11 7 1-2	£26 15 2	£32 7 7 1-4

Average Cost of Feeding each Sheep, Nine to each Lot.

Colonel Inge	£3 5 0 nearly.
Mr. Hardie	3 10 2
Lord Kinnaird's Leicesters	2 19 5 1-2
Lord Kinnaird's Cotswolds	3 11 11 1-4

Average Value of each Sheep.

Colonel Inge	£3 15 0
Mr. Hardie	4 1 10 1-4
Lord Kinnaird's Leicesters	3 11 3 1-4
Lord Kinnaird's Cotswolds	4 8 10 1-2

Food Consumed, Weight and Price of Wool, Weight and Price of Sheep, &c.

	Average Weight of Sheep at commencement.	Grass Pasture.	Clover, Cut.	Turnips.	Mangolds.	Hay Chaff.	Indian Corn.	Oil Cake.	Oats.	Weight of Sheep at Finish.		Weight of Wool.		Price of Wool.			Price of Sheep.			Price of Sheep and Wool.			Average Value of each Sheep.		
	lb.	Sqr. Yards.	lb.	lb.	lb.	lb.	lb.	lb.	b.	lb.	oz.	lb.	oz.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
1. Colonel Inge..................	86½	5909	2991	34,650	3822	887	195	1485	1098	156	2	68	4	6	5	1½	20	0	0	26	5	1½	3	15	0
2. Mr. Hardie..................	90	6244	3121	39,004	3953	1034	195	1657	1098	178	0	69	13	6	8	6½	22	5	0	28	13	0½	4	1	10¼
3. Lord Kinnaird's Leicesters......	78.8	5785	2508	32,999	3790	866	195	1233	1098	149	0	62	2	5	14	0	19	5	0	24	19	0	3	11	3¼
4. Lord Kinnaird's Cotswolds......	95.1	6121	3378	40,92[illegible]	4625	1107	195	1615	1098	180	5	81	10	7	9	8	23	12	6	31	2	2	4	8	10¼

Although the second table has little connection, if any, with the main point aimed at—the present trial not being conducted for profit merely, but more to test weights attained, and consumption of food required to obtain these—still, putting a money value on this food may help to bring out results more clearly. It is therefore assumed that the prices are alike for each lot, and as near the actual prices of the different articles at the time of the trial—say, pasture-grass at £3 per acre; clover at 3d. per stone, making the proportion of one-third hay at 9d. per stone; turnips at 8s. per ton; mangolds at 12s. per ton; Indian corn at £8 per ton; oilcake at £11 per ton; oats at 22s. per quarter, 40 lbs. per bushel.—*Scotland Agricultural Journal*.

APPENDIX.

ELEVENTH REPORT

OF THE

OHIO POMOLOGICAL SOCIETY.

Proceedings of the Annual Meeting of the Society, held at Toledo, January 12, 13, 14, 1864.

This meeting was held in the court house at Toledo, commencing Tuesday morning January 12th, according to announcement—all needful preparation having been made by the members of the Horticultural Society of Toledo, who already had a fine display of fruits on the tables, especially of winter apples.

After an hour or so devoted to shaking hands and arranging fruits, the meeting was organized, with the President, Dr. J. A. Warder, in the Chair, and M. B. Bateham, Secretary. An Address of Welcome was then delivered by J. Austin Scott of Toledo, Vice President of the Society, in behalf of the citizens of Toledo and the Lucas County Horticultural Society, expressing their interest in the meeting, and proffering to the delegates the hospitalities of their homes and firesides.

The Secretary made a report of the meeting of the committee *ad interim*, at Cleveland, during the State Fair in September, which was ordered to be published. He also presented a report of the Treasurer, which was accepted.

The President announced the following Committees:

On Credentials and Introduction of Delegates and Members—Messrs. J. F. Hall, George Baker and M. Shoemaker.

The duties of this committee are to introduce delegates and members to the Society; furnish the Secretary with a list of their names; and to increase the membership of the Society by those in attendance, or who are interested in the subject of Pomology.

On Railroad Memorial—Messrs. Dr. J. A. Warder, M. B. Bateham, and M. Shoemaker.

The duties of this Committee are to collect statistics of horticultural products transported by rail within the limits of this State, and, after consulting similar committees in other States, they will unite with them in preparing a suitable memorial to the railroad corporations in the hope of inducing them to grant increased facilities for attendance at Pomological meetings and exhibitions.

On Fruit Lists—Messrs. Geo. Powers, A. Fahnestock and L. S. Stowe.

This Committee will attend to the proper exhibition of the specimens presented, see that they are suitably displayed, and take the lists, with the names of exhibiters, and report the same to the Secretary.

On New or Rare Fruits—Messrs. F. R. Elliott, W. H. Scott, T. T. Lyon and Geo. M. Beeler.

This Committee is to examine the collections, so as to make selections of such specimens as they may deem of sufficient interest to bring before the Society for especial notice at this meeting.

On Business and Resolutions—Messrs. M. B. Bateham, John R. Miller and A. H. Macomber.

This Committee will prepare the programme and order of exercises for the meetings. All resolutions and communications are to be referred to them for presentation to the meeting at the proper time.

On Nominations—Messrs. John R. Miller, L. S. Stowe and J. F. Hall.

It is the duty of this Committee to prepare a list of candidates for election to the several offices of the Society.

The following resolution was adopted by the Convention:

Resolved, That gentlemen from other States, who manifest an interest in Pomology by attending the meetings of this Society, be regarded as honorary members, and be invited to participate in the discussions, and that the Secretary send them our Annual Report when published.

Among the fruits on exhibition were 31 varieties of apples from the Indiana Pomological Society, presented by Geo. M. Beeler and Wm. L. Loomis of Indianapolis; also 35 varieties by J. Austin Scott of Toledo; 30 varieties by Peter Shaw, and 16 varieties by M. Shoemaker of same place; 20 varieties by H. Kellogg of Lucas co.; 25 varieties by Jas. W. Ross, and 24 varieties of apples and 5 of pears by Geo. Powers of Perrysburg, besides numerous smaller assortments, from this and other parts of Ohio, and some from Michigan—in all, over 300 plates of fruit. There were also 4 plates of fine Isabella Grapes from Jas. Dunipace of Perrysburg, and several bottles of wine from the same; also samples of excellent wine from H. T. Dewey of Sandusky, and others.

In the afternoon the attendance of members was quite good, representing nearly all parts of the State, and very respectable delegations were on hand from Indiana and Michigan.

The discussion on Apples, with the revision of the Fruit Catalogue for Ohio, was entered upon and occupied most of the afternoon and part of the next day.

In the evening, according to announcement, the Annual Address of the President was delivered before the Society, and was listened to with marked attention and interest by a large audience. At its close a resolution was passed thanking the President for the address, and requesting a copy for publication in this report.

FRUIT CATALOGUE FOR OHIO.]

The American Pomological Society having issued (in 1862) a "Catalogue of Fruits for cultivation in the United States and Canadas, compiled from the reports of State and District Committees," our Society, last year, resolved to take up this catalogue and carefully revise it with reference to its adaptation to the State of Ohio; and, inasmuch as the different sections of the State are found so diverse in soil and climate, that fruits which succeed well in one section are sometimes found worthless in others, it was thought best to divide the State into *five sections*, thus:

North eastern—geological character—sandstone, conglomerate and coal measures.

North-western—cliff limestone and shale, drift mostly clay loam—plains.

Eastern, including also the South-eastern—sandstone and coal measures.

Central, including central western—cliff limestone and shale—clayey drift.

Southern, including South-western—mostly blue limestone, with marl and clay—hills and river valleys.

For each of these sections, it was agreed there should be a separate column in the catalogue, with such signs or marks as would indicate whether the variety of fruit named was known and approved, or otherwise, in that section. The mode of proceeding adopted was, for the chairman to read off the names as they occur in the list, then call upon the members present from each section, in turn, to express briefly their opinions, the Secretary noting down the same in their several columns.

In this way the whole catalogue was gone over, with Apples, Peaches and Pears; and the results were compiled in a convenient form—devoting the first page to brief remarks, and the second to the tabular columns. This catalogue was again revised at the present meeting, and the whole is republished in this report.

APPLES.

Explanation of Columns.—The figures preceding the names refer to corresponding figures on the opposite page, to save repeating the names.

The first column, *Season*. S. stands for summer; A. autumn; W. winter; E. early; L. late. Those not designated early or late, may be regarded as medium.

The second column, *Use*. K. kitchen, or for cooking; M. market (or *money*); C. cider. Those not designated may be regarded as for desert or general purposes. Those marked A. are specially for amateurs, being too small, or otherwise unsuited for profit.

In the remaining columns, three dots thus, ... signifies that the variety is not sufficiently known or tested in that district; a dash — signifies that it is known, but does not succeed well or is not approved; a star thus, * signifies it is generally approved; two stars, ** much approved; a dash and star, —* approved by some persons, or does well in some localities, not in others.

APPLES.

1. Alexander, showy, but poor quality; not approved or much grown.
2. Am. S. Pearmain, fruit approved, but Benoni as good, and grows better.
3. Ashmore, little known in Ohio; approved by some.
4. Astrachan Red, generally commended, especially for market.
5. Autumn Swaar, (sweet,) not generally known; some like it.
6. Baldwin, good North and East, and in some localities South.
7. Baily Sweet, approved where known; not sufficiently tested South.
8. Baltimore, (of *Elliot*,) good market apple, North and East; not generally known.
9. Bellflower, generally approved; not very productive or reliable.
10. Belmont, very popular North and East; not so good South.
11. Beauty of Kent, not much known or approved.
12. Benoni, much approved where known; especially South.
13. Bentley Sweet, good, late winter; not generally known.
14. Blue Pearmain, not approved; coarse and inferior.
15. Broadwell, known only central and South; approved there.
16. Bullock's Pippin, small, but fine flavor; for amateurs only.
17. Canon Pearmain, Southern; long keeper; little known.
18. Carolina June, not generally tested; approved by some.
19. Cogswell, not generally tested in Ohio; good North.
20. Cooper, good, but variable; poor grower; not generally approved.
21. Cooper's Market, little known; approved by some.
22. Danver's Winter Sweet, generally approved where known.
23. Dominie, not generally known; good and profitable for market.
24. Dutch Mignonne, showy, but too sour, little known.
25. Duchess of Oldenburg, handsome and fair quality; little known.
26. Dyer, or *Pomme Royal;* generally approved where known.
27. Early George, little known; similar to *Harvest;* better grower.
28. Early Harvest, approved by all, but not a good grower or very profitable.
29. Early Joe, small fruit, but very good, for amateurs only.
30. Early Pennock, or *August;* good for market and cooking,
31. Early Red Margaret, small, little known; not generally approved.
32. Early Strawberry, generally approved, though rather small.
33. English Russet, (Poughkeepsie Russet.) One of the best Russetts.
34. Fallawater, (*Tulpehocken,*) large and popular everywhere, though second rate.
35. Fall Pippin, good and popular, not very productive.
36. Fall Jennetting, approved only for cooking and market.
37. Fall Queen of Kentucky, approved South; little known elsewhere.
38. Fall Wine, handsome and good, but slower grower; little known.
39. Fameuse, generally approved where known; especially North.
40. Fenton Sweet, handsome and good; not generally known.
41. Fink, new, very long keeper; resembles *Tewksberry Winter Blush.*
42. Fort Miami, not much known; approved North-west.
43. Fourth of July, or *Siberian August;* resembles *Tetofsky;* handsome, new.
44. Garden Royal, for amateurs only; little known in Ohio.
45. Gilpin, or *Romanite;* approved as a long keeper; small, second rate.

	Season.	Uses.	N. Eastern.	N. Western.	Eastern.	Central.	Southern.
1	E. A.	K.	—	—	...	—	—
2	S.	A.	...	*	*	*	*
3	A.		...	...	...	...	*
4	E. S.	K. M.	*	*	*	*	*
5	A.		*	...	...	...	*
6	W.	M.	**	**	*	—	—
7	E. W.		...	*	...	*	...
8	W.	M.	*	*	...	—	...
9	W.	M.	—	*	—	*	*
10	E. W.		*	*	*	—*	—
11	A.	M.	—	...	...	—	—
12	S.		...	*	...	*	*
13	W.		...	...	...	*	*
14	E. W.		—	—	...	—	—
15	W.		...	...	...	*	*
16	W.	A.	...	*	*	*	*
17	L. W.	M.	...	...	...	...	*
18	E. S.	M.	...	...	...	...	*
19	L. A.	M.	*	*	...	...	...
20	A.	A.	...	...	—*	—*	—*
21	L. W.	M.	*	...	...	...	...
22	W.		*	*	...	...	...
23	W.	M.	...	—*	*	*	*
24	E. W.	K. M.	—	*	...	—	—
25	E. A.	K. M.	*	*	...	...	—
26	A.		...	*	...	*	—*
27	E. A.		...	...	*	*	...
28	E. S.		*	*	—*	—*	*
29	S.	A.	*	—	—	—*	—
30	S.	M.	...	...	*	*	*
31	E. S.		...	*	...	...	...
32	S.		*	*	*	*	*
33	L. W.		...	—	—	—	—
34	W.	M.	*	*	**	**	—*
35	A.	M.	—*	**	*	—*	—*
36	A.		—	...	...	...	...
37	L. A.		...	...	...	...	*
38	A.		—*	*	...	—*	*
39	A.	M.	—*	*	—	*	*
40	A.		*	...	...	...	*
41	L. W.		...	...	*	*	...
42	W.		*	**	...	...	...
43	E. S.	M.	...	...	...	*	...
44	A.	A.	*	...	...	...	...
45	L. W.	C. M.	—	—	—	*	*

APPLES.

46. Golden Russet, of New York, one of the best of Russets; generally approved.
47. Golden Sweeting, everywhere productive and profitable; second rate.
48. Gravenstein, handsome and good; not very productive.
49. Green Sweet, productive and good; approved where known.
50 Grimes' Golden Pippin, new; much approved where known.
51. Hawthornden, very productive and fair; second rate.
52. Hewe's Virginia Crab, valued only for cider; poor grower.
53. Higby Sweet, new, handsome and good; approved North-east.
54. High top Sweet, or *Summer Sweet;* small, but approved as earliest sweet.
55. Holland Pippin, or *Summer Pippin;* not generally known; good for cooking.
56. Hubbardston Nonsuch, good and popular, especially North.
57. Jeffries, new, promises well; approved where known.
58. Jersey Sweet, excellent for dessert; popular where known.
59. Jonathan, beautiful and first-rate fruit, but a slender tree.
60. Kaighs' Spitzenberg, large and showy; second rate; profitable sometimes.
61. Keswick Codlin, esteemed for cooking and market.
62. Kirkbridge White, popular South-west; little known in Ohio.
63. King, of T. Co., handsome and good; best at the North.
64. Ladies' Sweet, handsome and good, but over-praised East.
65. Lady Apple, small, but profitable, in some localities.
66. Large Striped Pearmain, not generally known; good South.
67. Large Yellow Bough, or *Sweet Bough;* good everywhere; not very profitable.
68. Liberty, new, good late keeper; not extensively known.
69. Lowell, or *Orange;* productive and profitable; generally approved.
70. Lyman's Pumpkin Sweet, large, sweet and good; not very productive.
71. Maiden's Blush, very productive and profitable everywhere.
72. May of Myers, approved as a late keeper; second rate.
73. Melon, little known in Ohio; approved by some.
74. Milam, rather small, but very productive and popular in some parts.
75. Munson Sweet, approved where known for apple butter and cider.
76. Newtown Pippin, does not generally succeed in Ohio; good some places.
77. Northern Spy, popular North, but a very tardy bearer.
78. Ortley, not as good as formerly in Ohio, but on new lands.
79. Paradise Winter Sweet, approved where known; not over productive.
80. Peck's Pleasant, one of the best, for North and East especially.
81. Pomme Grise, small, but excellent; for amateurs only.
82 Porter, good North and East; not a strong grower.
83. Primate, not generally known, but esteemed where known.
84. Pryer's Red, good in some localities; not very reliable.
85. Rambo, everybody wants it, and *will* have it!
86. Ramsdell Sweet, or *English Sweet;* productive and profitable; good grower.
87. Rawle's Janet, much approved South and South-west; small North.
88. Red Canada, good and popular, especially North; slender grower.
89. Rhode Island Greening, good North, and sometimes East, not South.
90. Ribston Pippin, not much known in Ohio.
91. Rome Beauty, very profitable and popular in Southern Ohio.
92. Roxbury Russet, generally good North, and some localities South.

	Season.	Uses.	N. Eastern.	N. Western.	Eastern.	Central.	Southern.
46	L. W.	M.	...	**	...	*	*
47	S.	M.	*	*	*	*	— *
48	E. A.		**	**	*	*	—
49	W.	K.	—	...	...	...	...
50	W.		...	...	**	...	...
51	A.	K.	—	—	...	— *	—
52	W.	C.	...	...	*	*	*
53	A.	A.	*	...	...	...	...
54	S.		...	...	*	*	*
55	L. S.	K.	...	*	...	...	...
56	E. W.	M.	*	*	*	— *	— *
57	E. A.	A.	...	...	*	*	...
58	E. A.		*	*	...	*	...
59	W.	M. T.	*	**	*	**	**
60	E. W.	M.	...	*	...	— *	— *
61	S.	K.	*	*	...	— *	—
62	S.		...	...	...	...	...
63	E. W.	M.	**	*	...	...	...
64	W.		...	*	...	...	*
65	W.	A.	*	*	...	— *	— *
66	W.	M.	...	...	**	...	...
67	S.	A.	*	**	*	*	— *
68	L. W.	M.	...	...	...	*	...
69	A.		*	*	*	*	*
70	L. A.	K.	—	—	— *	*	—
71	A.	K. M.	*	*	**	*	**
72	L. W.	K. M.	...	...	...	*	...
73	E. W.		*	*	...	...	*
74	W.		...	...	—	*	*
75	A.		*	*	...	*	...
76	W.		—	— *	—	—	— *
77	W.		*	**	*	— *	—
78	W.		—	—	—	—	—
79	W.		*	...	*	*	...
80	E. W.		*	**	*	— *	...
81	W.	A.	*	*	...	...	*
82	E. A.	M.	*	**	*	*	*
83	L. S.		*	*	*	*	...
84	W.		...	—	—	—	*
85	E. W.		*	*	*	*	*
86	E. W.		—	—	*	*	*
87	L. W.		—	—	...	— *	*
88	W.		*	*	**	*	*
89	W.	M. K.	**	**	*	—	—
90	E. W.		—	—	*	— *	—
91	W.	M.	—	*	*	*	*
92	W.	M.	*	*	*	*	—

APPLES.

93. Saint Lawrence, showy and good; approved North.
94. Smith's Cider, very productive; profitable for market central and South.
95. Smoke-house, approved by Pennsylvanians, North and East.
96. Sops of Wine, good and popular wherever known.
97. Spafford Russet, not extensively known; popular North-west.
98. Spitzenberg Esopus, generally approved North; not reliable South.
99. Stark, (see last report, page 5) approved where known, new as yet.
100. Summer Queen, good and reliable, but not great bearer.
101. Summer Rose, much esteemed, as an amateur variety only.
102. Swaar, good at the North, not so reliable South.
103. Talman Sweet, very productive and good, especially North.
104. Tetofsky, very showy, not generally known.
105. Trenton Early; approved where known for table and market.
106. Twenty Ounce Apple, large, showy, second rate; approved by some.
107. Vandervere of N. Y., or *Newtown Spitzenberg*; generally good, central and S.
108. Wagener, not generally known; promises well.
109. Westfield Seeknofurther, much esteemed North; not valuable South.
110. White Pippin, popular wherever known, especially central and South.
111. White Winter Pearmain, much esteemed in South-west.
112. Williams' Favorite, not generally known; esteemed by some.
113. Willow Twig, good only as a late keeper; poor grower.
114. Wine Sap, good and reliable, central and South; moderate grower.

	Season.	Uses.	N. Eastern.	N. Western.	Eastern.	Central.	Southern.
93	A.		*	...	...	...	—
94	W.	M.	*	...	...	*	*
95	E. W	M.	*	*	*	...	...
96	S.		*	—*	...	*	*
97	W.	A.	...	*	...	...	...
98	W.		—*	*	*	—	—
99	L.W.	M.	...	...	...	*	...
100	S.	K.	*	*	*	*	*
101	S.	A.	*	*	*	*	*
102	W.		*	*	*	—	...
103	W.	K. M.	*	*	*	*	*
104	S.		*	...	*	...	...
105	S.	T. M.	...	...	...	*	**
106	A.	M.	*	*	...	...	...
107	W.		—*	*	*	—*	—*
108	W.	M.	*	*	*	...	...
109	W.		*	*	*	—*	—
110	W.	M.	*	*	...	**	**
111	W.		—	—*	...	—*	—*
112	S.		—*	*	...	...	*
113	L. W.	M.	—	...	*	...	*
114	L. W.		**	*	*	**	**

DISCUSSION ON APPLES.

While revising the foregoing catalogue of apples, considerable discussion arose in regard to a number of the varieties. A good deal that was said has already been published by the Society, but the following points may be new to some:

Bullock's Pippin, *(Am. G. Russet)*.—Dr. Warder and several others said this variety has of late years so generally suffered by smut and scab in Southern Ohio, as, together with its small size, to render it hardly worthy of cultivation, even by amateurs, notwithstanding its fine flavor.

Baltimore, *(of Elliott)*.—Remarks were made commendatory of this as a market fruit; and inquiries for information respecting its true name or history, but nothing was elicited on these points. See last report, p. 3.

Cogswell.—Mr. Bateham expressed some surprise that this apple, said to be very good, and long cultivated in some parts of Northern Ohio, was seldom, if ever, seen at our fairs or other exhibitions. He hoped that members who had the opportunity would take some pains to bring it out, as very few had ever seen it.

Early George.—More information was also desired respecting this apple, supposed to be a seedling of Muskingum county, and of considerable promise. (See former reports). No definite response was made, and the hope was expressed that the committee *ad interim* would look after it the coming summer.

FOURTH OF JULY.—Mr. Elliott expressed the belief that this apple would be found identical with *Tetofsky*. Mr. Bateham admitted that there was much resemblance, both of fruit and tree; but the specimens of *Tetofsky* that had been sent to him from Cleveland were inferior in size, color and quality to the *Fourth of July* as grown at Columbus; and if the scions sent to him as *Tetofsky* were correct, it is not identical with the *Fourth of July*. He hoped the committee *ad interim* would settle this question next summer.

FINK.—Mr. Elliott inquired if this was not identical with *Tewksberry Winter Blush*. Mr. Bateham said no, but there was some resemblance in the appearance and character of the fruit. The growth of the trees is quite unlike, and the fruit of the *Fink* is larger and rounder than the other. See last report, p. 5.

GRIMES' GOLDEN PIPPIN.—Specimens of this apple were exhibited, tasted and fully discussed, and commended as very good. All who had tried it said it was deserving the high praise bestowed on it in former reports of the Society—a valuable addition to our list of winter apples, especially for the central and southern districts of our State.

JONATHAN.—This apple was spoken of as doing remarkably well in central and southern Ohio. Fruit very fair and good, not large, but just right for the dessert; tree rather a slender grower, but very productive. [In last year's report there was a typographical error in the Catalogue, p. 11, by which the line of signs for this variety was entirely omitted, and the number 59, on the opposite page, was repeated. It is corrected in this report.—*Sec'y*].

LADY APPLE.—Several members remarked that this little beauty was fast losing its reputation in most parts of Ohio—so liable to smut and scab, as to be seldom fit to appear in genteel society. The same has been true for some years past of the once fair and popular *Ortley;* and the *White Winter Pearmain* shows a tendency to the same faults.

RAMBO.—Some complaint was made that even this old standard variety, the most popular of all apples among our settlers from Pennsylvania and their descendants, is growing less popular and less in size each year, as the trees grow old and the soil loses its virgin strength. This, however, is largely owing to the tendency of the trees to overbear, and hence the fruit should be thinned while young. Manuring the orchard occasionally is also an advantage.

ROME BEAUTY.—Of this variety it was said, the trees commencing to bear quite young, seem to exhaust their vitality pretty early, and good soil and culture, with careful pruning, are needed to secure good crops of fair fruit from full-grown orchards.

APPLES DISCUSSED,

Not in the catalogue, some of which, with others, may be added next year.

OHIO NONPARIEL, (*Myer's Nonpariel*).—A desire was expressed that this and several other apples, should be added to the catatogue, and several members inquired why it was not oftener seen at exhibitions. All agreed that it was worthy of general cultivation.

LONDON SWEET, (*or Heick's Winter Sweet.*)—This also was deemed worthy of a place on the list. Mr. Bateham expressed the belief that it might yet be found identical with some old variety in the books and catalogues. He hoped that nursery-men and others, who had opportunity, would carefully compare the tree and fruit with other varieties of similar character, so that this question may be settled. He deemed it a valuable variety.

PHILLIP'S SWEET.—Mr. Elliott inquired what had become of Phillip's Sweet, a large red-striped sweet apple, exhibited at some of the early meetings of the society, and pronounced very good. He had not seen or heard of it of late years, and hoped it might be looked after.

LATE STRAWBERRY.—Mr. Storrs and Mr. Elliott spoke favorably of this variety, and thought it deserved more general cultivation. Mr. Lyon coincided, but deemed the *Chenango Strawberry* a better apple, of the same season.

SUMMER SWEET PARADISE.—Mr. Lyon spoke well of this apple; not quite first-rate, but deserving of culture.

EVENING PARTY.—Specimens by Mr. Nelson, of Ind., who regards it as one of the best dessert fruits for family use.

CHALLENGE.—Mr. Elliott and Mr. Lum spoke of it as a sweet apple, deserving commendation and culture.

SUMMER HAGLO.—Was spoken of as a fruit deserving attention for the markets, especially south and west. Very handsome in appearance, sprightly acid flavor, and sells for highest price. Mr. Bateham had seen it in Cincinnati, very beautiful to look at, but, like Red Astrachan and Tetofsky, a little too sour for these times of dear sugar.

HAWLEY.—All who had tried this apple spoke unfavorably of it. Sour, coarse, and not wanted.

GABRIEL.—Mr. Loomis, of Ind., said this variety was not worthy of commendation. Tree was a poor grower, and fruit not first rate, though fair looking.

HEREFORDSHIRE PEARMAIN.—Specimen by Mr. Lyon. He liked the fruit, but did not think it profitable; too liable to speck and rot. Dr. Warder coincided.

SINE-QUA-NON.—Several members expressed the idea that this is a misnomer; can do well enough without it.

REPORT OF COMMITTEE ON NEW OR RARE FRUITS.

APPLES.

Your committee respectfully report that considerable number of fruits have been presented them for identification, and correcting of nomenclature, and that so far as they have been able, they have assisted the presenters in giving them true names.

We have also examined a collection of fruit brought by Mr. G. M. Beeler, from Indiana, many of which are comparatively new, but as nearly, if not quite all, have been heretofore described, we deem it not advisable to again particularly note them.

An apple forwarded us from Prof. J. P. Kirtland, under name of "Tinmouth," we have examined; we count it only as negative in quality, although the specimen is very handsome in appearance. Its description may be found in Downing or Elliott.

From Mr. J. A. Scott an apple has been presented us under the name of "Pear Apple." It is pomologically considered a *good* fruit, but it may be an old sort hereafter to be identified. We consider it best at this time to omit any special commendation.

In addition, your committee would respectfully suggest that hereafter members who have new or rare fruits for exhibition and examination be desired to present them to the appropriate committees under the name by which they have been grown, accompanied by a statement of the habit of the tree, character of soil, age of tree, and such other characteristics as may aid in identifying old sorts, and deciding the probable value of new seedlings.

F. R. ELLIOTT,
T. T. LYON,
WM. H. SCOTT,
GEO. M. BEELER.

DISCUSSION ON PEARS.

In revising the catalogue of pears, remarks were made on comparatively few varieties, but the entire list as printed was carefully revised and corrected, as far as the experience or observation of the members aforded them ability.

Beurre d'Anjou, B. Diel, Bloodgood, Doynne Boussock, Duchess d'Orleans, and Julienne, received marks of higher commendation than last year.

Beurre d'Amanlis, Brandywine, Early Rousselet, and Passe Colmar, were moved downward a little.

Flemish Beauty.—Was very highly commended by persons who had the right kind of soil and location for growing it to perfection; but others had fruited it for years without having a well colored or first rate specimen.

White Doyenne.—Was reported as showing a disposition to *crack* in some parts of Ohio, as was its habit in most parts of the Eastern States, still it is good and reliable generally in the West.

Sterling.—Mr. Lyon said this was found a very profitable market variety in Michigan. Fruit always fair and handsome, good, though not first rate; tree a good grower, hardy, and productive; not tested as a dwarf. It is also a good deal grown around Boston.

Clapp's Favorite.—Mr. Elliott spoke of this new pear as deserving the attention of amatuers. It is figured in the Transactions of the Am. Pom. Society, 1860, and in the Report of Department of Agriculture, 1862. Was raised from seed by Thaddeus Clapp, of Dorcester, Mass. Described as large; resembling the Bartlett in size, form, and quality, but less musky in flavor; vinous melting, buttery and juicy; ranking as *best;* tree very hardy and vigorous.

Meriam.—Was also spoken of as promising well for market purposes. A native

of Roxbury, Mass., and very popular there, but little known as yet abroad. Described as a very thrifty grower, and great bearer; fruit needs thinning, and is best ripened on the tree.

LYCURGUS.—Mr. Elliott said this was an Ohio pear; originated at Cleveland, probably from seed of the Seckel, and resembling that variety in size, color and flavor, but more pyriform in shape, and ripening in winter. (See cut and description in Report of Department of Agriculture for 1062.) The fruit is too small for a market variety, but its excellence of flavor makes it desirable for the dessert.

GANSELL'S LATE BERGAMOTTE.—Mr. Lyon has found this very good and profitable in Michigan. Mr. Elliott considered it superior to the old Bergamotte. Mr. Bateham said it was a poor grower and a tardy bearer.

HOSENSHENCK.—Mr. Fahnestock and Dr. Warder recommended this pear as deserving attention. It is a native of Pennsylvania, very popular around Lancaster. Described as an early variety; very sweet, not first rate.

BEURRE HARDY.—Mr. Lyon and several others spoke well of it; recommended for trial.

DES TONGRES.—Mr. Elliott recommended it as worthy of trial. It is a large pear, of fine appearance, ripening in October and November, and will keep for several weeks after it is ripe; of a sprightly, vinous, or sub-acid flavor. (See Am. Pom., Report, 1862.)

BELLE WILLIAMS.—Was also mentioned as a new foreign pear of great promise, ripening in January.

NOTE.—A number of the varieties of pears marked as approved in the different sections of the State are but of recent introduction, and as yet only tested by a few individuals; but the well known good qualities of the fruits elsewhere, and the excellence exhibited on a brief trial, seem to warrant their commendation. It is also quite probable that a large share of those marked as untested will be found, on trial, equally deserving of commendation.

☞ EXPLANATION.—The same columns and characters are used as for apples, (see p. 8,) with the addition of the last right-hand column, in which Q stands for those varieties that are found to succeed best on the quince, (as *dwarfs;*) most of these, however, also do well as standards; but a few, marked S, are found unsuited for the quince, and are recommended only as standards. Those not designated have not been long enough tested on quince, or grow equally well on both kinds of stocks.

PEARS.

1. Ananas d'Ete, good as far as tested; said to be variable.
2. Andrews, little known; good where tested; on standard.
3. Bartlett, good every time; tree not very durable as a dwarf.
4. Belle Lucrative, excellent everywhere; best as standard.
5. Buerre Bosc, good only as standard; rather variable.
6. Buerre Clairgeau, beautiful and good; poor grower on quince.
7. Buerre d'Amanlis, profitable and good; especially North.
8. Buerre d'Anjou, universally approved; large and profitable.
9. Buerre d'Aremberg, sometimes good, but variable; poor on quince.
10. Buerre d'Brignais, or *Des Nonnes*, fair and productive; not first rate.
11. Buerre Diel, large and generally good, especially on the quince.
12. Buerre Easter, one of the best winter pears, if fully ripened: variable.
13. Buerre Giffard, excellent; tree of slender growth; best standard.
14. Buerre Golden of Bilboa, handsome and good; moderate grower.
15. Buerre Oswego, not fully tested; promises well.
16. Bloodgood, rather small, but excellent as standard; slender grower.
17. Bonne d'Ezee, productive and fair, not first rate.
18. Brandywine, vigorous and productive; very good.
19. Buffum, splendid grower; fruit good, but not first rate.
20. Cushing, a favorite with amateurs; not much known.
21. Dearborn's Seedling, small, but excellent; best as standard.
22. Dix, good fruit, but tardy bearer; won't thrive on quince.
23. Doyenne Boussock, worthy of general cultivation.
24. Doyenne d'Alencon, one of the best late pears; tree vigorous and productive.
25. Doyenne d'Ete, very productive and good.
26. Doyenne Gray, generally very good and profitable in Ohio.
27. Doyenne White, or *Virgalieu*; first rate in most parts of the West.
28. Duchesse d'Angouleme, large and profitable, especially as dwarf.
29. Duchesse d'Berri d'Ete, small, but handsome and good.
30. Duchesse d'Orleans, or *Buerre St. Nicholas*; very handsome and good.
31. Early Rousselet, very productive, and appears hardy; profitable; second rate.
32. Elizabeth (Manning's,) approved where known; rather small.
33. Figue d'Alencon, fine grower; profitable on quince.
34. Flemish Beauty, first rate everywhere, especially as standard.
35. Fulton, rather small, but good and productive; moderate grower.
36. Glout Morceau, excellent; rather late; not very productive.
37. Heathcot, handsome tree; very good.
38. Henry the Fourth, very productive and good sometimes; variable.
39. Howell, fine grower, and excellent, especially dwarf.
40. Jackson of N. H., little known; proves very good at Columbus.
41. Jackson's Elizabeth, productive, good, handsome.
42. Jalousie d' Fontenay, little known; very good sometimes.
43. Jaminette, not generally tested; very good winter.
44. Julienne, very productive, early and good.
45. Kingsessing, very hardy and good, as far as tested.
46. Kirtland, productive and fine, standard and dwarf; nearly first rate.
47. Lawrence, valuable winter fruit—one of the best.

	Season.	Uses.	N. Eastern.	N. Western.	Eastern.	Central.	Southern.	Dwarf or Std.
1	S.		*	*	*	*	*	
2	E. A.		*	*	...	*	*	
3	S	M.	**	*	*	*	*	S.
4	E. A.	A.	*	*	*	*	*	Q.
5	A.		*	*	*	*	*	S.
6	L. A.	M.	*	...	*	*	*	
7	S.		—	...	*	—	*	Q.
8	L. A.	M.	**	*	*	**	*	Q.
9	E. W.		...	*	...	—	—*	S.
10	E. A.		...	—	*	...	*	Q.
11	L. A.	M.	**	**	*	*	*	Q.
12	W.	M.	—*	*	*	—*	*	Q.
13	E. S.		—*	—*	*	*	*	
14	E. A.		—*	—*	*	*	*	S.
15	A.		...	—	...	—*	—*	
16	S.		**	**	*	*	*	
17	A.		...	...	—	—*	*	
18	E. A.		—*	—*	...	*	*	Q.
19	A.		*	*	*	—*	—*	Q.
20	A.		...	...	...	...	*	
21	S.		*	*	*	*	*	Q.
22	A.		*	*	*	*	*	S.
23	E. A.	M.	**	*	**	*	*	
24	W.		*	*	*	*	...	Q.
25	E. S.		*	*	*	*	*	
26	A.		*	*	*	*	...	
27	A.	M.	—*	—*	*	*	—	Q.
28	L. A.	M.	*	**	*	*	—*	Q.
29	S.		...	...	*	*	*	
30	A.		**	*	...	*	*	
31	S.	M.	—	...	*	—	*	
32	S.		...	...	*	...	...	
33	E. W.		...	...	...	*	*	Q.
34	A.	M.	**	**	**	*	*	S.
35	A.		*	...	...	...	...	
36	E. W.		—*	*	*	*	*	Q.
37	A.		...	...	...	...	*	
38	A.		...	—	*	—	—	Q.
39	A.	M.	...	*	*	*	...	Q.
40	A.		...	...	...	*	...	
41	A.		...	...	...	...	*	
42	A.		*	—	...	...	*	
43	W.		*	...	...	*	*	Q.
44	S.	M.	*	...	*	...	*	
45	A.		...	*	*	*	*	
46	E. A.		**	...	*	*	*	Q.
47	E. W.	M.	*	*	*	*	*	

PEARS.

48. Louise Bonne de Jersey; fine grower, great bearer, and good fruit.
49. Madelaine, one of the best early; good grower, as standard.
50. Napoleon, productive, juicy, vinous; not very good.
51. Noveau Poiteau, vigorous and productive; good if well ripened.
52. Onondaga, or *Swan's Orange;* large and productive; nearly first rate.
53. Osband's Summer, productive and fair; soon decays when ripe.
54. Ott, one of the best; resembles Seckel, and larger.
55. Passe Colmar, productive; very fine if well ripened; standard.
56. Rostiezer, good, high flavor; tree a straggling grower.
57. St. Ghislin, delicious, high flavor; slow in bearing.
58. St. Michael Archange, beautiful tree, and fine fruit; new.
59. Seckel, very productive and popular, though small fruit and tree.
60. Sheldon, considered the best of all American pears.
61. Steven's Genesee, approved generally in Ohio; a little variable.
62. Summer Butter, of *Mears*, late in bearing, good, early.
63. Tyson, delicious, one of the best early years.
64. Urbaniste, very good everywhere and every time.
65. Vicar of Winkfield, very productive, valuable.
66. Washington, deserves to be better known; good, to very good.
67. Winter Nelis, very fine, winter.

	Season.	Uses.	N. Eastern.	N. Western.	Eastern.	Central.	Southern.	Dwarf or Std
48	A.	M.	**	**	*	*	*	Q.
49	E. S.		*	*	*	*	*	
50	A.		—*	*	...	—*	*	Q.
51	A.		*	—	...	...	*	Q.
52	A.	M.	*	**	*	*	*	
53	S.		—*	*	*	*	*	
54	L. S.		...	...	—*	*	...	
55	E. W.		—*	—	...	**	**	S.
56	S.		**	**	*	*	*	
57	E. A.		—	...	...	—*	*	
58	A.		—	—	*	*	*	Q.
59	A.		**	**	*	*	**	
60	A.	M.	*	**	**	**	*	S.
61	E. A.		—*	—*	*	*	*	
62	E. S.		...	...	...	...	*	
63	S.		**	**	*	*	**	
64	A.		*	...	*	*	*	Q.
65	E. W.	M.	*	**	*	*	*	Q.
66	E. A.		*	—	*	*	*	
67	E. W.		*	**	*	**	**	S.

PEACHES.

Explanations.—In the first column, headed *Class*, F stands for freestone, and C for cling. The second column indicates the color of the *flesh*; W for white, Y for yellow: other columns the same as for apples and pears.

1. Barnard's Yellow, very good and profitable everywhere; resembles No. 35.
2. Bergen's Yellow, one of the best yellow-fleshed—mid-season.
3. Coles' Early Red, generally good and profitable for market.
4. Columbia, much esteemed South, not so good North.
5. Cooledge's Favorite, very good and profitable for market.
6. Crawford's Early, everywhere counted best of all for market.
7. Crawford's Late, very popular, but not a great bearer.
8. Druid Hill, little known in Ohio; esteemed by some.
9. Early Newington, similar to *Large Early York*; not as profitable.
10. Early York (Serrate,) good, but variable, and tree too tender.
11. George the Fourth, one of the richest and best; not very productive.
12. Grand Admirable, large, late cling, similar to *Heath*.
13. Grosse Mignonne, excellent and universally approved.
14. Haine's Early Red, similar to *Large E. York*, and deemed identical.
15. Hale's Early, new, and best of all very early.
16. Heath Cling, best and most popular late cling.
17. Heath Free, (not Kenrick's,) productive and popular for preserving, etc.
18. Jacques, large, handsome, and good; resembles *Crawford's*.
19. Lagrange, late, and sometimes very good, but variable.
20. Large Early York, productive and good everywhere.
21. Lemon Cling, handsome and productive; rather sour.
22. Morris White, much approved by the ladies for preserving, &c.
23. Oldmixon Free, one of the largest and best; profitable.
24. Oldmixon Cling, best of all clings, and very productive.
25. Red Cheek Melcoton, old and reliable market variety.
26. Rodman's Cling, similar to No. 24; not so well known.
27. Scott's Nonpariel, popular in New Jersey; little known in Ohio.
28. Smock, very productive and profitable; late.
29. Snow, unique and generally good—for amatures.
30. Stump the World, very popular where known; rather late.
31. Tippecanoe Cling, large, late; popular where known.
32. Troth's Early, very early, and generally good and profitable.
33. Ward's Late Free, good for a late variety, central and South.
34. Yellow Alberge, very productive and profitable for market.
35. Yellow Red Rareripe, similar to No. 1; very productive and profitable

	Class.	Color.	Season.	N. Eastern.	N. Western.	Eastern.	Central.	Southern.
1	F.	Y.	M.	*	*	...	*	*
2	F.	Y.	M.	—*	—	...	*	*
3	F.	W.	E.	*	*	...	*	—*
4	F.	Y.	L.	*	—	*	—*	*
5	F.	W.	E.	*	*	*	**	*
6	F.	Y.	E.	*	**	*	*	*
7	F.	Y.	M.	*	**	*	*	*
8	F.	W.	L.	—	...	...	...	—*
9	F.	W.	E.	—	—	...	...	...
10	F.	W.	V. E.	—	*	*	—	—
11	F.	W.	E.	**	*	*	*	*
12	Cl.	W.	L.	*	...	...	...	*
13	F.	W.	E.	—	*	*	*	*
14	F.	W.	E.	...	...	...	*	...
15	F.	W.	V. E.	**	**	**	**	*
16	Cl.	W.	V. L.	—*	*	*	*	**
17	F.	W.	L.	—*	...	...	*	*
18	F.	Y.	M.	—*	*	*	*	*
19	F.	W.	V. L.	—	. .	...	...	*
20	F.	W.	E.	*	*	*	**	*
21	Cl.	Y.	L.	*	*	*	—*	—*
22	F.	W.	M.	*	*	—*	—*	—
23	F.	W.	M.	**	**	*	**	*
24	Cl.	W.	M.	*	*	*	*	*
25	F.	Y.	M.	*	*	*	*	*
26	Cl.	W.	L.	...	...	...	*	*
27	F.	Y.	L	*	...	...	*	...
28	F.	Y.	V L.	*	*	*	*	*
29	F.	W.	M	—	—	—*	—	—
30	F.	W.	M.	...	...	...	*	*
31	Cl.	Y.	L	*	...	...	*	*
32	F.	W.	V. E	*	...	*	*	*
33	F.	W.	V L	*	*	—	*	*
34	F.	Y.	E	*	*	*	*	—
35	F.	Y.	E	*	**	**	**	*

DISCUSSION ON PEACHES.

In revising the catalogue of peaches, there was much discussion in regard to the names and characters of different varieties, of which the Secretary took the following notes:

BARNARD'S YELLOW, and *Yellow Red Rareripe*, also *Yellow Rareripe*, of many catalogues—Mr. Bateham and several others remarked that these names are applied to one and the same peach, (see Kenrick,) a fine large round peach, with deep yellow flesh, skin mostly covered with purplish red, ripening about with Crawford's Early. But the Yellow Alberge, also sometimes called Yellow Rareripe, is a smaller and earlier peach, less red outside, sometimes called "Honest John," but this name is oftener applied to the large Early York. It is very productive and profitable for market.

CRAWFORD'S LATE—Complaints were made of this variety, that it was not very profitable for market, being rather a shy bearer. The same was said in regard to Bergen's Yellow, though a very excellent peach for quality, and ripening at a time when a first rate yellow peach is needed—a week later than Crawford's Early.

COOK'S SEEDLING—Mr. Hill and one or two others expressed doubts as to this being identical with Crawford's Late. The question was left open for further observation.

EARLY YORK *(Serrate)* was condemned by nearly all present as an unprofitable variety; tree tender and liable to mildew; not wanted now we have Hale's Early.

HAINE'S EARLY was declared identical with large Early York, and some regarded Early Newington as the same.

HALE'S EARLY was pronounced the best of all early peaches, and a great acquisition. Complaint had been made that the fruit was liable to rot on the tree in some seasons, but not more so, it was believed, than others of the fine early varieties. It was also stated that it lacked sufficient firmness of flesh for distant transportation, but this is only because of its juiciness and fine quality.

HEATH FREE—Dr. Warder remarked that this was distinct from Kenrick's Heath, and not identical with Morris White, though similar to it, and desirable for the same purposes.

Several varieties of peaches were proposed to be added to the catalogue, viz: President Free, Large White Cling, White Imperial, Sturtevant (of Elliott), Gardner's Seedling (of Toledo), and Crocket (of New Jersey). Mr. Bateham also spoke of a peach resembling Bergen's Yellow, said to be a seedling of Warren county, called Orange Freestone; but none of these were generally known by the members, and the matter of extending and correcting the list was deferred for next year.

The Secretary remarked that the confusion that exists among nurserymen and others respecting the names of peaches, was often a source of vexation and disappointment to fruit growers, hence it was important that this matter should be attended to. He had often been asked to name an assortment of ten or twelve varieties of peaches, ripening in succession, for market purposes, and not feeling satisfied with his own knowledge he had asked the opinions of several extensive peach growers on this point, the result of which he read to the Society, and with some additions, are here appended:

Selections of Peaches for Market in the Order of their Time of Ripening.

I. *By Isaac Pullen of New Jersey.*

1. Hale's Early.
2. Troth's Early.
3. Large Early York.
4. Crawford's Early and Yellow Red Rareripe.
5. Oldmixon Free.
6. Mary's Choice and Reeves' Favorite.
7. Stump the World, Ward's Late, Harker's Seedling, Late Rareripe, and Crawford's Late.
8. Smock, Beer's Smock, and Crocket's Late White.
9. Heath Cling.

Remarks.—"Hale's Early is the best and earliest. I know of none better than Troth's to follow. We have need of none ripening between Large Early York and Crawford's Early, as there is not a week's difference in time. Oldmixon Free is the best market peach to ripen between Crawford's Early and Crawford's Late. Bergen's Yellow is too shy a bearer. Scott's Nonpariel is unprofitable with me as an orchard variety—it ripens too unevenly. Stump the World has produced well the past two seasons, and bears carriage remarkably well. Beer's Smock is new as yet, similar to the old variety, but grows larger and brings a better price in market; both are very good and profitable. Crocket's is a fine late white peach. Heath Cling is the latest of all. These together occupy about one week to each number, making our peach season last about nine weeks, one full week having been added by the Hale's Early."

II. *By George M. Beeler, Indianapolis.*

1. Hale's Early.
2. Troth's Early.
3. Cooledge's Favorite.
4. Large Early York.
5. Barnard's Early and Crawford's Early (largely.)
6. Oldmixon Free.
7. Oldmixon Cling.
8. Crawford's Late.
9. Smock.
10. Heath Cling.

III. *By F. R. Elliott, Cleveland.*

1. Hale's Early.
2. Troth's Early.
3. Yellow Alberge.
4. Cooledge.
5. Large Early York.
6. Crawford's Early.
7. Sturtevant.
8. White Imperial.
9. Oldmixon Free.
10. President.
11. Ward's Late.
12. Tippecanoe Cling, or Grand Admirable.

IV. *By M. B. Bateham, Columbus, O.*

1. Hale's Early.
2. Troth's Early.
3. Yellow Alberge.
4. Cooledge.
5. Crawford's Early.
6. Oldmixon Free.
7. Oldmixon Cling.
8. Jacques' Rareripe.
9. Stump the World.
10. Crawford's Late.
11. Smock.
12. Heath Cling.

V. *By F. P. Hill, Warren county, O.*

1. Hale's Early, (not fully tested.)
2. Troth's Early.
3. Large Early York, or "Honest John."
4. Crawford's Early.
5. Oldmixon Free.
6. Crawford's Late.
7. Heath Free.
8. Smock Free.
9. Heath Cling.

VI. *By T. T. Lyon, Plymouth, Michigan.*

1. Hale's Early, (not tested.)
2. Troth's Early.
3. Cooledge's Favorite.
4. Large Early York.
5. Crawford's Early.
6. White Imperial.
7. Barnard's Yellow Red Rareripe.
8. Oldmixon Free.
9. Crawford's Late.
10. New York Cling, (sparingly.)
11. Tippecanoe Cling, "

Dr. L. Collins, of St. Josephs, Michigan, writes:

"Our next peach, after Hale's Early, is Wheeler's Early (small and poor); then Troth's, followed by Cooledge's, "Honest John," (yellow), and Crawford's Early, and five or six days later comes Bergen's Yellow, the best of all yellow-fleshed peaches, but a shy bearer; next Oldmixon Free, Ward's Late and Crawford's Late; and last of all, Keyport White, (freestone,) which stands at the head of all late peaches in this region for market purposes, ripening after frosts come in October."

DISCUSSION ON GRAPES

CATAWBA—Dr. Taylor said it did not ripen well with him the past season; fruit was generally well colored, but was not sweet; he had formerly thought warm sandy soil the best, but found the best grapes this year on clayey soil.

Mr. Elliott thinks the Catawba ripened about as well as in the average of seasons around Cleveland; the must was from 75 to 80° by the saccharometer, which is the usual average for that region, and makes fair wine. One vineyard, five miles back from the lake, on clay soil, had better grapes than any other in the county the past season. There were about 500 acres of vineyard in bearing in Cuyahoga county, and 500 more planted the past 2 or 3 years—1,000 in all.

Mr. Powers, of Perrysburg, said the Catawba ripened pretty well with him the past fall, on the east side of Maumee river, 16 miles from the lake, and 8 miles from Toledo; but back from the river, on the prairie, it did not ripen. The vineyard of Mr. Neely, on the west side of the river, ripened well.

J. Austin Scott had the Catawba ripen well for more than twenty years, 7 miles from Toledo, at Fort Miami, on stiff clayey soil; vines never killed but once; fruit very good, perhaps not quite as sweet as on lake shore.

Mr. Dewey, of Sandusky, said crop ripened well the past season, though frost killed the leaves quite early (October 12th) in many vineyards, but did not injure the fruit. He presented samples of wine made from the crop of the past season, the must of

which weighed 90°. It was pronounced good, though too new to be fairly judged. He said frost did not injure well ripened Catawbas; one year ago he left some on the vines till the 20th of January, and they were sweet and fine; ice was on the bay then.

Mr. Barney, of Sandusky, said his crop had done well, considering the severe test of frost. When fruit is ripe, with a *bloom*, it is not injured by frost. Tops of the vines were badly cut by frost (October 12th) in some vineyards, but fruit not injured; picked some in December, sweet and good.

Mr. Lum, four miles from Sandusky, had a few vines of Catawba not well pruned; fruit did not ripen; leaves killed by frost 12th of October.

Mr. Kelly, of the Island, said crop ripened well, no frost till 1st to 10th of November; no injury to the grape; must as sweet as ever; season two or three weeks longer than on main shore. Vegetation on the Island starts when the water in the lake reaches 40° of temperature, (about two weeks later than on the main land,) then no frosts occur.

Mr. Boalt said the Catawba had not done well at Norwalk; soil sandy and gravelly, not as favorable as heavy soils, if well underdrained; had seen grapes pretty good at Berlin, three miles from the lake.

Mr. Woods, of Jefferson county, Ohio, said near the Ohio river the Catawba ripens well, but not so well a few miles back.

Mr. Bateham, of Columbus, did not think the Catawba often ripened perfectly around Columbus, and yet it was called ripe, and made a fair sort of wine; he thought other varieties would supersede it in a few years.

Dr. Warder said around Cincinnati the *rot* was the great misfortune of the Catawba; the crop of the past season was not over one-third to one-half a fair average; he expected a yield of 800 gallons, and only got 50; others were more fortunate. A wine grape that shall prove equal to the Catawba, and exempt from the rot, is the great desideratum there.

Messrs. Lyon, Scott, and Adair, of Michigan, spoke of the Catawba as seldom ripening well there.

Mr. Nelson, of Fort Wayne, Ind., said it generally ripened so as to be called good, and sells well, but is not very sweet.

Mr. Beeler, of Indianapolis, said it did pretty well there, especially on limestone soil.

Mr. Emery, of Ill., said on river-bluffs the Catawba was found pretty good; other parts not much value.

Clinton.—Mr. Elliott and Mr. Bateham were of the opinion that this variety might be dispensed with, now that so many better hardy varieties can be had.

Mr. Storrs, of Painesville, considered it worth cultivating, so hardy, vigorous, and productive; fruit pretty good after a frost, and ladies like it for pies.

Mr. Scott liked it better than Isabella for eating, but some doubts were expressed as to his being the Clinton.

Mr. Dewey had made wine of it, strong and harsh, with three pounds of sugar to the gallon, and one-half water; was pretty good.

Mr. Barney thought it was worth growing for wine where the Catawba will not ripen.

Mr. Emery, and others, thought it valuable at the North, but might be generally displaced by Concord and H. Prolific.

Dr. Warder liked the Clinton when fully ripe; and it makes pretty good wine, (better than the Oporto,) which may be found valuable for mixing with other wines.

Concord.—Dr. Taylor considered this the grape for the farmers, or those who will not take the pains to cultivate finer varieties.

Mr. Elliott and Mr. Powers expressed similar opinions; called it the people's grape; hardy, vigorous, early, productive and good, though not first rate.

Mr. Campbell said, without being a very good grape, it had many good qualities; not very good to carry or to keep; good for home use and home market only; he would cultivate it for its hardiness, earliness, and productiveness.

Mr. Fahnestock, of Toledo, said it was very hardy and reliable, and the grape for the million.

Mr. Scott, of Adrian, and others, from Michigan, also spoke highly in its favor.

Mr. Nelson, of Ind., said the Horticultural Society of that State had recommended it as the best single variety for the million.

Mr. Emery said it was more disseminated in Illinois than any other variety.

Cuyahoga.—Dr. Taylor referred to his remarks at the meeting of the Ad interim committee, and said the fruit did not ripen as well as he had hoped the past season, hence he had some misgivings as to its reliability in his climate, still he had hopes that it would improve as the Diana and some others had done. The leaf sometimes mildewed.

Mr. Barney had the fruit ripen well, but late; quality better than Lydia, but three or four weeks later.

Mr. Campbell said it did not ripen with him, nor did the Catawba; he thought the one would ripen where the other would.

Delaware.—Mr. Storrs and Dr. Taylor called it the best of all grapes, especially for amateurs; grows strong enough with proper soil and culture; thinks it will also prove a good wine grape.

Mr. Elliott coincided, and said it bears carriage finely, though he thought it was liable to crack if not picked soon after ripe.

Mr. Powers and Mr. Lum found it the best of all grapes.

Mr. Boalt the same, and said he considered it just as much a farmer's grape as the Concord; for he did not see why the *best* grape was not the best for farmers as well as for other people.

Mr. Nelson said he was a farmer, and he liked the Delaware grape, but he would venture the prediction that it would never be as extensively planted or approved by the million as the Concord.

Mr. Campbell spoke of the Delaware as keeping remarkably well till Christmas or later.

Mr. Dewey expressed surprise at this, and said, with him it was the poorest variety

of all to keep; "What, poorer than the Concord?" asked one: "Yes, poorer than any other;" said Mr Dewey, "for I put a basket of about twenty pounds of fine bunches in my cupboard one day, and in 24 hours afterwards not a grape was to be found!" This proof was deemed quite conclusive that the Delaware is a bad grape to keep!

DIANA.—Mr. Elliott and Mr. Storrs said their impressions of this grape were more favorable than formerly.

Mr. Bateham thought it very variable; had seen it quite poor, ripening unevenly and flavor very bad, and at other times very good; he was not yet prepared to recommend it highly.

Mr. Lum had it ripen well, but flavor was too foxy.

Mr. Jones, of Toledo, liked the flavor, found it ripens as well as Catawba.

Dr. Warder thinks the vine a little tender; does'nt quite like the fruit; not fit for table, thick skin and pulp objectionable; may prove useful to give flavor to wine like the Delaware.

HARTFORD PROLIFIC.—Mr. Elliott spoke well of it as an early and hardy grape, good for the north. Its chief fault is the habit of the berries falling off as soon as ripe, rendering it unfit to carry to market.

Mr. Powers likes it well, berries do not fall off much after the first one or two crops.

Mr. Dewey and Mr. Boalt approve moderately, another "farmers' grape." The gentlemen from Michigan and Indiana also like it pretty well.

ISABELLA.—Mr. Storrs said this was still a good and popular grape in many parts of the country, though not so much thought of as formerly. He alluded to the habit of this variety to *sport* or vary in the form and size of berry and bunch, and the discussions that had arisen therefrom, some persons supposing there were two or more kinds.

Mr. Bateham said this subject was discussed at some length at the meeting of the Committee Ad interim in September, and he read an extract from the report of the same.

Mr. Elliott said there were certainly two varieties of the Isabella on Kelley's Island some years ago, if not now, and also in Medina county, and some other parts.

Dr. Taylor said he was at Dr. Kirtland's one day, as grapes were ripening, and Dr. K., said: "There was a good Isabella till the roots got into that *sewer*, and now it is a good *Aiken*." He had noticed wherever the supposed two varieties existed, that the *Aiken* had the richest soil.

Mr. Campbell said he had vines from Dr. Kirtland, as the *Aiken*, planted them in rather poor soil, and the fruit was simply the old Isabella.

Mr. Powers found the Isabella doing well in his locality; had noticed the disposition to vary in size and shape; where he had dug a trench and put in dead dogs, manure, &c., fruit large, round, resembling the Union Village, while others retained the old size and shape.

Mr. Dunnipace, of Perrysburg, had seen grapes exhibited as a new variety, very large, round berries and compact bunches; procured cuttings from the vine, and set

them in a vineyard along with the common Isabella, and the fruit was precisely the same—the old shape and size.

Mr. Bateham spoke of the improvement of this grape by good culture, and of the necessity of thinning the crop when bearing full, to ensure its ripening evenly.

Mr. Dewey said he had made fair wine from this grape, but the addition of a little sugar was necessary, the must only weighs about 70°.

Mr. Adrian said the Isabella was more grown than any other variety in Michigan, and was approved there.

Logan.—Mr. Elliott spoke well of this grape: had seen it several years; as early as the Hartford Prolific, and better quality.

Mr. Barney had known it very many years; original vine on Scioto river, in a big wild cherry tree; thought it the best early grape.

Mr. Nelson had known it in Indiana, 25 or 30 years; it was introduced there from the Scioto country; he thought it of some value for earliness and hardiness, but not of very good quality.

Mr. Campbell said it was very hardy and early, fair quality, but deficient in size of bunch and productivemess.

Lydia.—Mr. Flliott thought this might be found a good grape for early market culture; has thick skin, fitting it to bear carriage well, fine color, and good flavor.

Mr. McKelvey, of Sandusky, said it had done well with him the past season—rotted the year previous.

Mr. Barney and Mr. Lum, of Sandusky, had observed it for several years; thought well of it, but did not think it a good bearer.

Mr. Ward said he had a fair crop of it, but not half so much fruit as on the same wood of Isabella. Did not think it sufficiently productive for a market variety.

Mr. Campbell had found it early and good—not quite as early nor as productive as the Delaware.

Mottled.—Mr. Elliott said the more he saw of this grape the more highly he esteemed it; thought it might prove a good wine grape.

Mr. McKelvey had seen it several years at Mr. Carpenter's; did not think very highly of it.

Mr. Barney has had it for six years; finds it improves; counts it worthy of trial by amateurs.

Norton's Virginia was spoken of by Dr. Warder and others as becoming very popular as a wine grape in Missouri and the southwest, but doubts were expressed whether it could be relied on to ripen its fruit generally in Ohio; though Mr. Elliott said he had known it to ripen well at Cleveland.

Rebecca.—Dr. Warder, Mr. Fahnestock, Mr. Powers, Mr. Elliott, and others spoke well of it.

Mr. Campbell said it was not quite hardy, and mildews sometimes.

Mr. Adair said it wants a little protection in Michigan, but fruit is fine, and he likes it.

Rogers' Hybrids.—Mr. Campbell, by request, stated his views at considerable

length in regard to these new grapes, describing the most valuable and promising ones; but his remarks being in substance the same as already published in this and other journals, it is not necessary to occupy space with them here further than to say that, as the result of his experiments with a large number of these seedlings, he gives the preference to the following six, in the order here named: Nos. 3, 15, 19, 33, 4, 9. No. 3 he considers best of all he has yet tested. It ripens with the Delaware.

ALLEN'S HYBRID.—Mr. Elliott spoke well of it as an amateur variety; had doubts whether it is a *hybrid;* perhaps only a seedling from a foreign sort. Mr. Campbell likes the fruit—good deal like Chassellas—has not mildewed as yet—seems as hardy as Isabella—fruit too delicate for market; season a little later than Delaware. Mr. Patterson had found it very good in Michigan.

ADIRONDAC.—Mr. Elliott spoke of this new grape as promising to be the best early hardy grape known—the vine as hardy as the Delaware, and a vigorous grower; fruit of fine size and quality; very early and productive; not yet fruited in Ohio.

CREVELING.—Mr. Campbell had fruited it, and finds it a pretty good early grape—better than Hartford Prolific and quite as early.

Mr. Campbell gave a brief account of his experiments in raising new varieties of grapes from seed, mentioning several hybrids that he thinks may prove of value, but which have not been sufficiently tested as yet.—See an article from his pen in the Report of the Department of Agriculture for 1862. Remarks were also made on quite a number of other new grapes, but too little was known respecting them by persons present to make it worth while to publish what was said.—*Sec'y.*

ON GRAPE CLIMATE AND CULTURE.

The proximity of this meeting to the famous grape regions of Kelley's Island and the adjacent coasts of Lake Erie, secured the attendance of quite a number of gentlemen engaged in this branch of horticulture, and nearly a whole day was devoted to discussions on the soil and climate best adapted for grape growing, modes of culture, training, pruning, &c.

J. W. Scott, Esq., read a paper on the peculiarity of the climate of this grape region, as compared with the vine-growing districts of Europe and other parts of this country, giving statistics from the Smithsonian reports of the fall of rain in different parts of the year, &c. The average amount of rain during the summer months is found to be, at Cincinnati, 14 inches; Cleveland, 10 inches; Ann Arbor, 8 inches; Sandusky and Toledo, about 9 inches. He attributes the remarkable success of the grape in this region to several causes: the excellence of the soil—calcareous, marley clay, naturally dry or easily drained; the climate sufficiently warm to ripen the fruit; moderate fall of rain, and seldom heavy dews or fogs during the latter part of summer and early autumn; the blossoming of the vines being retarded in spring by the coldness of the water in the lake, absorbing the warmth of the air till danger of late frosts is over, and the ripening time being prolonged in the fall by the warmth of the lake keeping off early frosts.

Mr. Scott referred to a valuable essay on the Climatology of American Grape Vines,

by J. S. Lippincott of N. J., published in the Report of the Department of Agriculture, and from which he read the following extracts:

"It has been demonstrated that at those localities where the summer mean temperature falls below 67° the wine grape will not ripen its fruit so as to produce wine of any valuable quality; 65° mean summer temperature is the lowest that will permit the vine. Extremes of *humidity and dryness* are exceedingly injurious to the wine grape. [He quotes *Blodgett's Climatology.*] Throughout the Northern States the fall of rain during the summer varies from 9 to 14 inches. '*The region over which the fall of* 9 *to* 10 *inches of summer rain extends includes all the localities* where the cultivation of the vine, in the Northern section of our country, has been attended with the largest share of success.' At Cincinnati and St. Louis the summer fall of rain is about 14 inches.

"*Temperature as affected by the Lakes.*—In May, the water of the lower lakes, *one foot* below the surface, is but 7° above the freezing point. Its temperature rises gradually to that of the atmosphere *the latter part of July*, and *above it in August.* In September it is nearly *three* degrees warmer, and to the middle of October it retains the temperature of 58°, which is 6° above that of the air along the southern shore. The region around the southwest shores of Lake Erie, Blodgett says, corresponds more nearly than any other section of our country to the wine-growing regions of the Rhine."

In reference to the distance inland from the lake, which these advantages extended, considerable difference of opinion prevailed. Mr. Dewey, of Sandusky, thought that an average of about a mile was as far as could be relied on. Mr. Scott thought two miles would be safe if the soil was good, but in going towards Cleveland from Sandusky, the character of the soil changes to a sandy loam, which is not as favorable for grapes, especially for making wine. This was followed by remarks of similar import by Mr. Kelley, of the Island, Mr. Elliott, of Cleveland, and a number of others.

Soils.—Mr. Dewey said the Catawba grapes grown on sandy lands east of the Huron River ripened well, apparently, but were not as sweet as those grown at Sandusky, and on the Island—the latter showing 90° or 92° by the saccharometer, and the former only 75° or 80°. Mr. Elliott said that 75 to 80 was about the average of the Catawba must at Cleveland, and which had been regarded as making fair wine. He would like to see some rule established in regard to the strength of the must requisite for making good wine. Dr. Warder said at Cincinnati the range was from about 75 to 90°.

Mr. E., respecting soils, said he believed facts prove that clayey soils are best for grapes, especially for wine. One reason probably is, such soils do not start up the heat and growth so early in spring as warm, sandy soils, and they retain the heat longer in the fall.

Mr. Kelley said, Mr. Addison Kelley once used stable manure on a portion of his vineyard, and it caused the fruit to speck and rot for several years. Plaster is found to have no effect on the Island.

Mr. Dewey had tried slaughter-house manure and lime mixed, a shovelful to a

vine, on a vineyard of one acre, with very good results. Mr. McKelvey said no manure was generally used around Sandusky, and the best vineyards were on the poorest land. Mr. Barney preferred to be near the lime rock.

Mr. Elliott said no manure was often used around Cleveland; when it had been tried it usually caused mildew on the fruit and vines.

Preparation of Soil.—Mr. Kelley said the first requisite was to *drain* the land thoroughly—he makes the drains about 40 feet apart. Next plows as deeply as possible, say 15 to 18 inches. Trenching with the spade is not practised in that region, nor deemed of advantage. Mr. Elliott said trenching is not now practised around Cleveland, and is not necessary if land is well drained. It was formerly thought that sloping hill-sides were requisite for vineyards, but that was a mistake; most of the vineyards in Cuyahoga county, and also around Sandusky, are on level lands.

In planting young grape-vines Mr. Kelley recommended cutting off all the surface roots, as if left to grow the lower roots will die and all will be surface roots, to the detriment of the vine. [Is that *fact*, or only *theory?—Sec'y.*] Dr. Warder said another reason for preventing the growth of surface roots is, they are apt to be in the way of the plow or cultivator, in tilling.

The distance apart for setting the vines on the Island is about 6 × 8 feet, which is a little over 900 to the acre. This is allowing the vines more space than has been the practice at Cincinnati, and most other places.

Note.—The discussion on planting, training, and pruning the vines is not published here, as the information may be found in better form in the Patent Office Report for 1861, and in several other publications.—*Sec'y.*

ON PLUM CULTURE AND THE CURCULIO.

Mr. Bateham inquired whether any progress could be reported in the cultivation of plums in Ohio, or in discovering a mode of preventing the ravages of the curculio. Mr. Scott said the best remedy for the curculio was to cut down all the plum trees and not plant any more; we can easily do without them. Mr. B. said he was not disposed to give up the contest so readily; for his part, if he had suitable land and opportunity he would as soon plant an orchard of plum trees with an expectation of profit as any other kind of fruit. He referred to the practice of Messrs. Ellwanger and Barry of Rochester, and their success, by the *jarring* method. Their plum orchard is on a level piece of ground, convenient to the house and workshops. It is a part of their system to spade the ground each spring, then roll it hard and smooth, just as the trees are in blossom, or when the insects begin to appear. It is kept hard and smooth during the summer, so that the fallen fruit can easily be gathered up and burned. Then during the three or four weeks that the "little Turks" are about, the trees are jarred two or three times a day with a blow from a mallet having an India-rubber cushion on its face, to prevent injury to the bark, a *catcher* in the form of a light frame with muslin stretched on it being first spread under the tree, on to which the insects drop, and from which they are transferred to a pail of scalding water.

This process is quite simple and easy, and very little expense compared with the

value of the crop, when a good number of trees are concerned, as would be the case where cultivated for market; but for half a dozen or so trees, as in a private yard or garden, of course it won't pay.

Mr. —— inquired if the practice of digging the ground and beating and rolling it hard, when the trees were in blossom, was not the substance of the *Mathews Remedy* for the curculio, of which there was a good deal of talk some years ago?

Mr. Fahnestock said that he was a personal friend of Mr. Mathews, and was one of the committee to whom he imparted a knowledge of his remedy for the purpose of having it tested and the result made known. That committee, of whom Mr. Barry was also a member, had never been satisfied that the remedy was sufficiently effective to answer the expectations of the public or the desires of the inventor; and now that so long time has elapsed he believed there was no object to be accomplished by keeping the matter secret. In fact it was already pretty extensively known, as we have just learned, and is a part of the method practised by Ellwanger and Barry, to wit, spading the ground under the trees, turning it over as deeply as can be done, and beating it hard just before the insects ascend the trees in the spring. At this time, it was claimed, the insects would be very near the surface of the ground, and if buried 4 to 8 inches deep and the ground made hard above them, they were unable to make their way out. Mr. F. was of the opinion that if this was properly done at the right time, it was of considerable advantage, and no doubt contributed materially to the success of Messrs. Ellwanger and Barry, although they probably relied mainly on the jarring of the trees afterwards.

Mr. A. G. Hanford, of Columbus, spoke of the contrivance of Dr. Hull of Alton, Ill., for jarring plum trees. He has a light, folding frame, covered with cotton cloth, with an opening on one side to admit the body of the tree; this is placed on top of a sort of wheelbarrow so constructed that it can be wheeled from one tree to another, and striking against the tree cause sufficient jar, by its momentum, the frame or *catcher* being at the same time brought into position without the operator having to let go the handles of the barrow, except occasionally to empty out the insects.

Mr. Nelson said he had tried the jarring process pretty thoroughly without success —did not think it would pay. Mr. Storrs had succeeded so well with it that he had to prop up his plum trees to prevent their breaking down with fruit. Mr. Lyon had seen good results from jarring; said the curculio often stings apples, as seen by its mark, but he thinks the worm does not live so as to come to maturity there, as he never could find a live one of considerable size in an apple; and the wound always seemed to have healed. He also thought the worms did not generally come to maturity in cherries, the fruit ripening too early for them.

Dr. Lungren, of Toledo, said he had paid much attention to the habits of the curculio; he found that it was not disposed to fly from tree to tree, except when disturbed, or in search of the proper nidus for its eggs. He had considerable faith in Mathews' remedy, and also in jarring; but the latter would need to be continued for a longer period than three or four weeks, for he had discovered a second crop of the insects, depositing eggs, as late as the 1st of July; but probably this second brood is

not often so numerous as to cause much damage, especially as fruit is then so far advanced.

BLACK KNOT IN PLUM TREES.—Mr. Storrs said he formerly lived in Cortland Co., N. Y., and there the *black knot* very generally prevailed, as it does in many other parts of that State; he had recently seen it very bad in Western Pennsylvania, around Erie and Gerard; but he had not seen any of it in Ohio; he could not tell why it should prevail in those States and not in this; had noticed that it was, seemingly, worst in cold, clayey lands, where beech and hemlock timber prevails; he was not aware that the cause of the disease, or the remedy, had as yet been discovered.

Mr. Elliott, Mr. Stowe, and several others were familiar with the disease, but had never seen it in Ohio except in young trees brought from the East, and then it did not spread. Dr. Warder said the opinion had been put forth that this disease was caused by the curculio depositing its eggs in the young branches, when it could not find fruit; but this idea was erroneous and soon abandoned. The eggs of the curculio and other insects may have been found in the soft, pulpy substance produced by the disease, but that was an effect and not a cause of the evil. The real cause had not been discovered; and no better remedy was known than cutting off the affected parts and burning them. Similar disease exists in some kinds of forest trees, as the scrub oak, in certain parts of the country.

ELECTION OF OFFICERS.

The Committee on Election made the following recommendation of officers for the ensuing year:

For President—Dr. J. A. WARDER, of Cincinnati.

For Vice President—J. AUSTIN SCOTT, of Toledo.

For Secretary and Treasurer—M. B. BATEHAM, of Columbus.

Committee Ad-Interim—G. W. Campbell, of Delaware; S. B. Marshall, Massillon; F. R. Elliott, Cleveland; J. R. Miller, Springfield, with the above officers.

The report of the Committee was confirmed by the meeting, and the officers recommended were elected.

RESOLUTIONS ADOPTED.

Mr. Elliott, of Cleveland, offered the following resolution, which was unanimously adopted by the Society:

Resolved, That the President, Vice President, and Secretary of the Ohio Pomological Society be a Committee empowered in the name of this Society to petition the State Legislature for a grant of money sufficient to pay the traveling expenses of the Ad-Interim Committee, in examining, comparing and preparing a report on early and late summer fruits, or such as cannot be brought together for examination at our regular annual meetings.

Mr. Bateham offered the following, which was also adopted:

Resolved, That the Committee Ad-Interim be requested to make a report on Strawberries and other summer fruits, the coming season, from observations made by them

in two or more sections of the State, and that their traveling expenses for this purpose be paid by the Society as far as there may be funds on hand.

A resolution was also adopted thanking the President for the very able and gentlemanly manner in which he had presided over the deliberations of the Convention.

Another resolution was adopted by acclamation, thanking the citizens of Toledo for their very cordial and generous hospitality to the members and delegates of the Society from abroad, during the three days of the meeting.

NEXT MEETING OF THE SOCIETY.

Mr. Storrs, in behalf of the citizens of Painesville, O., invited the Society to appoint its next annual meeting at that place.

Mr. Miller did the same in behalf of the citizens of Springfield, O.

Several members of the committee expressed their preference for Painesville; [and the Secretary of the Society is now a resident of that place.]

FRUITS AND WINES EXHIBITED.

Indiana Horticultural Society, by G. M. Beeler, Secretary—31 varieties of Apples.

J. A. Scott, of Toledo—85 varieties, most of them correctly named.

M. Shoemaker, Toledo—16 varieties.

Peter Shaw, Toledo—30 varieties

H. Kellogg, Adams township, Lucas county—20 varieties.

E. L. Nichols, Toledo—10 varieties.

James W. Ross, Perrysburg—25 varieties.

A. Fahnestock, Perrysburg—6 varieties.

T. T. Lyon, Plymouth, Michigan—8 varieties.

R. Marshall, Painesville—8 varieties.

George Powers, Perrysburg—24 varieties.

A. P. Reed, Waterville—10 varieties.

M. B. Bateham, Columbus—4 varieties.

James Dunipace, Wood county—10 varieties.

H. Hefflebower, Montclovia, Lucas county—18 varieties.

George Powers, Perrysburg—5 varieties of Pears.

E. L. Nichols, Toledo—1 variety ditto.

James Dunipace, Wood county—4 plates of magnificent Isabella Grapes.

George Baker, Toledo—2 pots oranges, in fruit.

H. T. Dewey, Sandusky—Catawba Wine, vintage of '62 and '63; Isabella, vintage of '62 and '63; Kittridge, vintage of '63; Black Currant, vintage of '63.

James Dunipace, Wood county—Catawba and Clinton, vintage '61; Isabella and Clinton, vintage of '62; Red Currant.

Mrs. Joseph Bell, of Washington township, Lucas county—7 varieties of Wines—Elderberry, Isabella, Peach, Raspberry, Pear, Red and White Currant.

APPLE JELLY FROM CIDER.

C. Cory & Sons, of Lima, Indiana, exhibited specimens of Apple Jelly made from

new cider on a sorgho evaporator. It was very much admired for its fine color and consistence, as well as excellent flavor. The opinion was expressed that the article will become one of considerable commercial importance, as well as a domestic luxury.

The following communication from the manufacturers was read:

Ohio Pomological Society:

RESPECTED SIRS—We send you by express several specimens of cider jelly, which you will please have the goodness to test and dispose of *ad libitum*. It is made purely of the juice of the apple, without any admixture whatever, no sugar and no chemicals. The apples were ground and pressed in the ordinary way, and the cider, after being strained, and before its fermentation, was passed in a thin and nearly continuous current over the intensely heated surface of our clarifying and evaporating sugar pan. The whole process of cleansing and condensing to the requisite consistency for jellies, being about eight gallons into one, is performed in from twenty to thirty minutes from the time that the cider enters the clarifier until it leaves the opposite end of the evaporator, duly cleansed, condensed and cooked. From fifteen to twenty barrels of cider may be thus transformed per day of ten hours' service, on a pan of suitable dimensions for family or neighborhood use.

Our apparatus is made of copper, and proves equally adapted to the manufacture of these pleasant tarts and our northern sweets. It is observable that cider jellies do not (at least in our three years' experiments,) conjeal into candy, nor mould on the surface. Its flavor also improves by age. The jellies herewith presented are of this past season's manufacture—were made of a mixture of tart and sweet apples, and the fair samples of several thousand gallons made in this region by ourselves and by others who have adopted our implements and method of manufacture. An abundance of the like may, in propitious seasons, be made to advantage in all the fruit-growing portions of our country. It has been much admired wherever introduced, and our physicians prefer it for their patients to other jellies made of the best materials.

Respectfully submitted,

C. CORY & SONS, Lima, Ind.

January 11, 1864.

MEETING OF THE AD INTERIM COMMITTEE.

At Cleveland, September, 1863.

DISCUSSION ON GRAPES AND PEACHES.

This meeting was held on Wednesday evening, the week of the State Fair, for the purpose of examining some of the fruits on exhibition at the Fair, and discussing their merits, &c.

The season having been quite favorable for grapes, the display of this fruit was uncommonly fine, and embraced a large number of new varieties, or such as are but little known; hence it was thought best to devote most of the time of the meeting to this subject.

The President of the Society (Dr. Warder,) not being present, the Vice Presiden J. Austin Scott, took the chair. The Secretary, (Mr. Bateham,) stated the object of the meeting, and presented specimens of a number of varieties of grapes and peaches taken from the tables at the Fair, which he desired to have examined and discussed—these fruits not being in season at the usual time of the meetings of the society.

GRAPES.

Cuyahoga.—Specimens nearly ripe, quite good. Mr. Bateham said he had heard several persons at the Fair express their dissent from the remarks of Dr. Taylor in our last report on this variety—that it deserved more praise than was there awarded it.

Dr. Taylor replied that for two or three seasons past, this variety had not met the expectations of its friends; but it had done better the present season, and he was persuaded when the new vines came into bearing, with proper treatment, it will sustain all reasonable expectations and representations that have been made respecting it.

Lydia.—Specimens fine—from Mr. Carpenter, of Kelley's Island, and Mr. Campbell, of Delaware. Mr. Bateham said he had seen the vines in bearing at Mr. Carpenter's, and was quite favorably impressed—more so than heretofore with this variety—he regretted that Mr. Carpenter was not able to be present and give the result of his experience.

Mr. Campbell said the Lydia had fruited finely with him this season—though last year it showed some disposition, in common with many other varieties, to rot; less, however, than Catawba, Diana, Anna, and some others. This year it has no superior in flavor and quality, except the Delaware, in my collection. Its time of ripening is only about one week later than Delaware; berries large and very handsome—bunches on young vines rather small, though larger than those of Rebecca at same age. His present impression is that the Lydia will prove one of the very best light colored grapes yet introduced.

Allen's Hybrid.—Another white or light-colored grape—Mr. Campbell said it fruited well with him this season, and is a very handsome and good grape. The bunches rather large and compact; berries full medium, color and flavor much resembling the Chassellas; skin thin, flesh tender and delicate—valuable for amateur culture, but too delicate for market, or for distant carriage.

Mr. Bateham said he had hoped this would prove just what we wanted for a hardy white grape; but from what he had seen of the vine and fruit, he was afraid it was too much like its foreign parent to prove hardy and reliable here; still he would recommend it for trial by amateurs. Dr. Taylor spoke favorably of it, and thinks it may prove hardy and valuable.

Rebecca.—Fine specimens exhibited, and the fruit esteemed by all present, but the feeble growth of the vine and liability to mildew in unfavorable seasons, were admitted to be serious objections.

Creveling—Specimens fully ripe—good, but not high flavored—resembling Isabella. Mr. Bateham said he had found this in bearing the present season at Mr. Carpenter's, on Kelly's Island, also at Mr. Ensign's, in Lake county; he was pleased with the variety, especially on account of its earliness.

Mr. Campbell said he had tested it, and so far his impressions of it were favorable; he found it earlier than any other black grape of decent quality, much superior to the Hartford Prolific in its flavor and freedom from pulp, as well as in hanging perfectly on the vine, even when over ripe. The Creveling is ripe very soon after it is colored, and does not, like many others, need to hang a long time to acquire its best flavor.

Diana.—Fine bunches exhibited from Columbus, Cleveland, and other sections—not fully ripe, but quite good, and promising well. Specimens of a spurious kind were also exhibited—quite worthless in character, but the vines have been extensively disseminated for genuine. Mr. Bateham said the vine had fruited well at Columbus, and was much liked by amateurs, though he had not found it as much earlier than the Catawba in its time of ripening as its Eastern friends had claimed for it.

Capt. Stewart, of Cleveland, had not thought much of the Diana until last season, and the present it had done very well with him. This season he had found it almost equal to the Delaware. Mr. Boalt, of Norwalk, also spoke well of it—said it ripened ten or twelve days earlier than the Catawba with him. Dr. Taylor thought it was variable in quality and time of ripening; he had it very good this year. Mr. Powers said he had two vines, got for Diana; much alike, but not quite identical; one ripened a week or two before the other—perhaps several spurious varieties are abroad.

Anna.—Specimens unripe, and the testimony of all who had tried it was, that it ripens too late to be of value in this latitude.

Ontario and *Union Village*—Specimens of both these were exhibited, and so nearly alike that most persons would say they were identical. Mr. Luce, of Ashtabula, had fruited the Ontario two seasons, and was well pleased with it; vine grows well, seems perfectly hardy, and free from mildew; fruit ripens about the same time as the Isabella; bunch and berry larger, not of first quality, but good. Dr. Taylor also spoke favorably of it; was not sure that it would not prove identical with Union Village, as had been claimed by some of the eastern pomologists, but he thought otherwise. Mr. Campbell would not say positively that the Ontario is not the Union Village; but the difference in fruiting on his vines the past three years has led him to doubt their being the same. The vines called Ontario have invariably stood the winter and spring frosts better, and had larger and more compact bunches, and ripened earlier than the Union Village. Their habit of growth and foliage are alike.

Tokalon, Garrigues, and Louisa.—Dr. Taylor said, could only be regarded as sub-varieties of the Isabella, and of no particular value.

Isabella and "Aiken."—Most of the grapes exhibited at the Fair as Isabellas were of the kind having large compact bunches, and large round berries, so unlike the old style of Isabellas that few persons could regard them as the same, and yet the testimony of a large number of the growers would seem to show that the change is only the result of soil, season, and culture. Mr. Bateham called attention to the remarkable difference among the specimens exhibited; he said his attention had first been called to this subject by witnessing similar exhibitions in this part of the State two or three years ago, and on calling the attention of fruit growers to it, through the papers, he was informed that the large round variety was not the Isabella, but should be called

the *Aiken*. Since that time he had seen more of these grapes and the growers, but he is still unable to satisfy himself that there are two distinct varieties—and yet he admits that the difference in the specimens is greater than he has ever supposed could be produced by soil and culture.

Capt. Stewart said he had found in his vineyard great difference among Isabella vines, in the size, shape, and time of ripening of the fruit, as affected by the soil and location; could cut some ten days earlier than others—thinks all the difference in the specimens exhibited may be effects of soil, &c. Mr. Storrs, of Painesville, expressed the same opinion.

Mr. Oviatt, of Richfield, Summit county, said he had a vineyard partly on clay soil and part sandy loam; the vines all propagated from one source by himself, and those growing on the sandy soil produce larger and more compact bunches, and larger and rounder berries than those on the clay—difference like that exhibited in specimens here to-night and at the Fair; hence he did not believe in the Aiken variety.

Dr. Taylor thought it would be found that the large round specimens grew on rich sandy land where the roots found plenty of food and moisture, and the vines not overloaded with fruit. Dr. Kirtland had told him that last fall he found the large round (Aiken) variety growing on his ground where the vine stood near a sewer, while other vines of the same origin, on common soil, bore old fashioned Isabellas.

Mr. Wild, of Brownhelm, Lorain county, said that a variety resembling the Isabella, but a rounder berry was introduced in his neighborhood fifteen or twenty years ago, by a German, who claimed to have brought it from Germany (?) Specimens of the fruit were sent to Mr. Longworth, and he pronounced it Isabella or a sub-variety of it. Mr. Bateham thought this might be another branch of the Aiken. He was convinced that there had been several good seedlings raised from the Isabella, during the past forty years, and pretty extensively disseminated through the country, but he did not believe any of the stories about such grapes being brought from the old countries.

Dr. Beardslee, of Painesville, said there was a seedling variety of the Isabella growing in his vicinity which he thought was earlier and larger than the old one.

CONCORD—Only a few specimens at the Fair, but very good. Mr. Bateham thought this variety was becoming more popular than had formerly been expected; though not a first-rate grape in quality, its merits in other respects were sufficient to gain for it the good will of *the people*.

Mr. Smith, of Toledo, said he had seen it rot badly in Montgomery county; when the Catawba also rotted badly. Captain Stewart said he served on a committee last fall for inspecting vineyards in Cuyahoga county, and while most other varieties were found more or less affected with rot, the Concord was free and healthy.

TAYLOR'S BULLITT.—Dr. Taylor said this variety had done so much better with him this year that he felt inclined to speak more favorably of it than he had done formerly. It may prove valuable, especially as a wine grape.

OPORTO.—Specimens exhibited and *tasted* by some! who expressed their utter dis-

gust and surprise that *such* a grape should ever be recommended to the public. It was thought to be too mean a fruit for even the possibility of making wine that could be palatable.

Rogers' Hybrids.—Specimens of several varieties exhibited, from Mr. Campbell's collection. Mr. Bateham said he was willing to award much praise to Mr. Rogers for having shown that our native grapes can be crossed with foreign sorts, but he regretted that Mr. R. should have felt it necessary to choose the coarse Fox grape and Black Hanburg as the parent of his batch of nurslings. The progeny is certainly as good as could have been expected, but he was apprehensive that people will be disappointed in not finding the fruit of finer quality. Perhaps, however, Mr. Rogers has better things in store than have yet been given to the public.

Mr. Campbell, at the request of the Secretary, furnishes the following notes on these grapes: "I think some of the hybrids of Mr. Rogers promise to be real and valuable acquisitions, though my experience with them is not yet sufficient to be entirely satisfactory on all points. The present is the third year since I have fruited a portion of them. I have never given them any winter protection, and though the past four winters have not been of extraordinary severity, these hybrids have all proven hardy and uninjured. They are all strong growers—some of them extraordinarily so. None have thus far shown any disposition to rot, and but one—No. 13—any signs of *oidium*, or mildew of the leaf, and this to no apparently injurious extent. As to quality, none of them equal the Delaware, or approach near it, so far as I have at present tested them. But I regard Nos. 3, 4, 5, 9, 15, 19, and 33 as superior in flavor and quality to Isabella and Concord, while they are, most of them, also much superior in size and appearance to those varieties. As to their productiveness, I do not consider that sufficiently tested, though the indications are so far good. To most persons who have tasted these hybrids in my presence, they have been very acceptable, and regarded as very valuable and good."

PEACHES.

The show of peaches at the Fair was not very large, the crop being light, or a failure in most parts of the State. Among the lots shown, were only three or four sorts not well known.

Dr. Taylor had a fine dish labeled "Middleton's Imperial." The tree came from New Jersey, and was sold to him under that name; but he finds no such name in any of the books or catalogues. It is a large handsome yellow peach, ripening early in September, about the season of Crawford's Late; not as highly colored as that variety, but like it apparently not sufficiently productive for a good market variety. Dr. T. thinks it may prove to be the Susquehanna or Griffith peach of Pennsylvania, which it certainly resembles.

Mr. E. Corner, of Columbus, exhibited a dish of highly colored peaches, supposed to be a seedling variety—resembling Bergen's Yellow—large roundish, deep yellow, nearly covered with red; flesh very yellow, juicy and good—sweeter and more juicy than most yellow flesh varieties; ripens between Crawford's Early and C. Late; said

to be productive. Mr. Bateham promised to make further inquiry respecting it, as he thought it migh prove valuable if productive and a seedling.

Bergen's Yellow.—Mr. Bateham said he believed this to be the finest market peach known to him as coming in season after Crawford's Early, and before Crawford's Late; though he was not quite certain in regard to its productiveness. It is called Orange Freestone in some parts of Ohio. The Jacques' Rareripe is also a good yellow peach, ripening about the same time, and much esteemed for the markets, though not as rich and juicy as Bergen's.

Hale's Early (too late for specimens).—Mr. Bateham said he had seen this variety in bearing this season for the first time on the grounds of Storrs and Harrison, at Painesville—where the Serrate Early York and Early Tilloteon were growing in the same row and under precisely similar circumstances. From what he saw and tasted of the fruit he can say that its merits exceed his highest anticipations, as to earliness, size, looks and quality of fruit and the habits of the tree, and he is not at all surprised to learn that people are loud in its praise wherever it has come into bearing. The Chicago peach-growers say it is so much earlier than any other good market variety, that they are in want of another kind equal to it to fill up the interval of a week or so between the time when Hale's is finished and the next comes in!

Dr. Taylor said he had seen and tasted the fruit the two past seasons, and it was undoubtedly the best early peach extant. Market peach-growers were now eagerly buying and planting the trees in all parts where it is known. The nurseries would not be able to supply half the demnad for trees.

Mr. Marshall, of Massillon, had fruited it this year; ripe about ten days sooner than Early York (Serrate); fruit handsomer, full as good, and tree much healthier. M. Boalt, of Norwalk, and Dr. Beardslee and Mr. Storrs, of Painesville, bore the same testimony.

AN ESSAY:

READ BEFORE THE SOCIETY BY T. T. LYON, OF PLYMOUTH, MICHIGAN.

On the adaptation of the Lake Regions for the growth of Fruit, with hints as to the marketing of the products.

That the lacustrine portions of the great Northwest possess, by virtue of their peculiar location, a climate eminently adapted to the production of fruits few we imagine, at the present day, will be disposed to question.

It is a common and strictly correct remark that, on account of our exposure to lake winds, we are subject to great and sudden variations of temperature. This, however, must be taken in connection with the fact that, in passing over these immense bodies of water, our winds are so far shorn of their frostiness that we often escape those extremes of cold which occasionally fall with such fatal severity upon sections farther west, and even south of us. As proof of this I may be allowed to refer to the storm just now passed; during which the thermometer in most of Southern Michigan was at or about the freezing point, accompanied with rain at the east and snow at the west during the first day; and at sunset on the second day it had reached its minimum, at or near —20°, while in Wisconsin we are told it reached the extreme limit of —45°, and even as far south as St. Louis it reached —24°. As another and a very striking confirmation of this modifying effect permit me to refer to the series of cold winters of the last decade, which so nearly swept away the entire orcharding of the regions lying west and southwest of these lakes, while the peninsula of Michigan and the south shore of Lake Erie escaped with scarcely a decimation.

I am not, however, disposed to attribute the successful production of fruit in this region to climate alone. It is a well settled opinion among agriculturists that no single crop can be grown with equal success upon all soils, and that fruit-growing is no exception to this rule I am not disposed to doubt. We, at the west, have virgin soils containing in abundance all the elements necessary to the growth of wood as well as the production of fruit, and we shall hardly be questioned if we assume as a rule that our soils grow richer and deeper as we go westward, at least so far as the plow of the settler has yet brought them under subjection. As this increment of richness may be assumed to be mainly the result of an increased proportion of vegetable matter, the natural office of which is the production of wood rather than fruit, the suspicion may easily and naturally be induced that to this cause may, to some extent, be attributed the comparative unproductiveness of many eastern varieties of fruit when planted at the west. If to this consideration we add that of the almost tropical heat

and often severe drought of our western summers, which tend to produce a sort of summer *hybernation* followed by renewed growth, continued late into autumn, leaving the tissue loaded with moisture, we shall be at no loss to understand the effect upon western orchards of the tempestuous winds of a semi-arctic winter careering down upon them across the treeless western plains, with almost the last drop of moisture wrung from them in passing the Rocky Mountains, rupturing their tissues by the intensity of the frost, and robbing the trunks and branches of the moisture upon which their life depends, while all supply from the root is effectually cut off by an inexorable zone of frost at the surface.

Whether this affords a true and sufficient explanation of the disasters of our western prairie orchardists may perhaps be considered doubtful, and the ideas are put forth with the hope that those interested, and upon the ground, may be induced to bring them to the test of experience.

Exempt as we of the inter-lake region happily are, in the main, from these terrible calamities, and possessing soils abundantly stored with all the elements necessary to the success of both trees and fruit, an enlightened self-interest would lead us to foster this source of income and wealth to the utmost.

While you of Ohio probably possess some of the finest vine-producing regions of our country, we of Michigan are trying to rival if not excel you with the peach, and possibly time may determine that even with your favorite fruit we are not so far behind you as we now suppose.

How the State of Ohio is progressing in the general planting of fruits, I am but illy informed, but so far as most parts of Southern Michigan are concerned this interest is advancing with great rapidity, and the fear is not unfrequently expressed that the supply may outrun the demand. Notwithstanding this fear, the supply has continued to increase, while prices have so far been fully maintained. Indeed when we consider with what rapid strides the wave of emigration is pushing Westward as well as Northward, together with the uncertainty of the fruit crop so far as tried at the far West, we have little occasion to fear an over-production even for the supply of our home markets. To this may be added the fact that a large portion of the South and Southwest must draw its supply from the North.

But my special purpose in opening this branch of the subject is to call attention to a new avenue for the disposal of our surplus fruits, to which we are obtaining access through the commercial development of the lake region. I allude to the opening of a direct trade between the lake ports and Europe by way of the St. Lawrence. American fruits are no new thing in English markets, and suitable varieties properly put up always command prices abundantly remunerative. Heretofore the West has been practically debarred from competing for this trade in consequence of the impossibility of getting their fruits to the seaboard at a price and in a condition to warrant their shipment. With the establishment of direct trade this difficulty disappears, and a cargo of fruit once on shipboard at any of our lake ports, in good condition, will only require to get out upon the Atlantic before the shutting up of the St. Lawrence, to be reasonably sure of a safe delivery at any European port.

The project now before the country for the enlargement of the Erie Canal, or a por-

tion of it, so as to enable it to pass our lake vessels, would, if carried into effect, still further facilitate this interest by extending the season during which freight of this character could be dispatched.

The opening of this trade would probably necessitate an entire change in the usual manner of selecting and packing fruits. The transportation of fruits by railroad has always been objectionable, for the reason that the constant jar of a train, together with the close packing and pressing necessary as a safeguard, leaves the fruit in a condition, to a great extent, fatal to its long keeping. For this reason it would doubtless prove that apples, delivered by railroad at the seaboard, or even at our lake ports, pressed into barrels in the usual manner would be unfitted to withstand the attacks of decay during an ocean voyage at the usual temperature of the hold of a vessel.

It would, doubless, be found also to be true economy to send on such a voyage only the fairest and most perfect fruits, leaving the refuse to find a market at home as best they may, and to press them but lightly, if at all—never allowing the barrels to be rolled, or carried except by hand, or upon springs, so that the fruit can suffer no injury even should it get loose in the barrel.

This trade would of necessity be limited mainly to winter varieties, although by the employment of steamers the time might be so far shortened as to permit the transit of the later fall varieties with safety.

Should an important trade grow up in this direction, the question "What varieties shall we plant?" would assume a new importance. At the present time the most popular apple in English markets is the Newtown Pippin. This is generally attributed to the persistent and well-directed efforts of a single exporter, an extensive planter of this variety; although it is also claimed that its high piquant flavor is especially adapted to the English taste. Recent quotations from the Ajax of British Horticulture, however, indicate that the Northern Spy is now in the ascendant. It is a grave question respecting this variety whether its delicacy of texture is not so great as seriously to impair its value for transportation to great distances. We hear comparatively little of Red Canada as a market fruit in Ohio, and it must be confessed that the tree is not quite satisfactory, especially in the nursery, but the fruit has such an assemblage of valuable qualities that, especially in Eastern Michigan, it is being planted more extensively by far than any other variety. It is, perhaps, too mild to suit the present English taste, but if once known in their markets its fine size and great beauty, together with its abundant juice and fine aroma, cannot fail to make it popular; while, to the shipper, its firmness of texture will especially commend it.

To these we may add Esopus Spitzenburg, Golden and Roxbury Russets, Rhode Island Greening, and Baldwin, where it is not too subject to the bitter rot, and probably several others.

Although at first thought the increased distance might be supposed to be a serious obstacle in our way, this is believed to be more than counterbalanced by the greater cheapness of production at the West, while the greatly superior quality of Western grown fruits, compared with those grown at the East, can hardly fail to give them a decided advantage wherever they may come in competition.

PRESIDENT'S ADDRESS.

DELIVERED AT THE ANNUAL MEETING, TOLEDO, JANUARY 12, 1864.

Fellow-Members of the Ohio Pomological Society:

At your last convocation, held at Columbus, the Capital of our noble State, you did me the honor to elect me to this distinguished post. The position of presiding officer in a Society of gentlemen distinguished for their industry and talent in the pursuit of knowledge in this delightful and ennobling art of Pomology, was then accepted with pride; yet, while acknowledging your partiality in the selection of one who had always preferred being an active, working member, this high office, with its honors and responsibilities, was assumed with diffidence and under a protest, because my preferences had already been expressed, as one of the nominating committee. A worthier member had been presented for your suffrages—one to whom we are all indebted for his untiring zeal in the cause, if not indeed for the very existence of our Society.

Your will, however, and his declension, produced a different result, and while submitting to it, allow me again to beg of you, my fellow-workers, all the kind consideration you can bring in aid of your presiding officer, so that our now venerable Society may retain its high respectability, and continue its eminent role of usefulness, even under a president who feels infinitely more and deeper interest in the investigations of natural objects, than in the details of the economy and management of a debating society. Expect in your president no parliamentary tactician, or you will be disappointed.

Fellow members and citizens:—Pomology is a word of modern times, though of ancient derivation; its meaning—the history and qualities of the apple or fruits in general—being derived from the Greek language. The apple, as prince of fruits, was taken as the representative product. Just as in Europe, the farmers speak of *corn* when they mean grain of any kind; so in horticultural language, *pomology* is made to embrace the descriptions and history of all fruits, instead of the more correct derivation, *Carpology*, which has been proposed but never adopted.

The objects of this study and pursuit are first to know familiarly all the various fruits we cultivate, their modes of production, culture, and their peculiarities; to know them intimately, so as to recognize them at a glance, how modified soever by different soils and climates; to know them, not only in their perfect state of fruit, but also by the foliage, twigs, limbs, buds, bark, and by the form and habit of the trees upon which they grow. Further, we should, as pomologists, understand the terminology that has been applied to the several varieties in different sections of the country;

we must learn the names by which they are respectively known, with all the synonyms so as to be able to unravel the confusion that has existed in this branch of our subject. But, more than all this, we should earnestly strive by study and by observation, to acquire an intimate knowledge of the inner life of the plants under our care; we should study vegetable physiology, we must understand the laws of plant life.

The uses of these investigations may be called for by some captious inquirer. They are so apparrent to us as to make this appear a trifling inquiry. They enable orchardists to cultivate successfully, and agreeably to the laws of nature thus learned and to recognize the fruits of his production by the leaf, the buds, the twig, the bark, and by the form of the plants under his care, as well as by the perfected product. They prevent the planting of many trees with different names, that will eventually produce the same variety of fruit, being synonyms of some widely cultivated variety. Further, they enable us to make judicious selections of the varieties best adaped for our several soils, situations, and latitudes, as well as to our tastes and the wants of the markets that are to be supplied with the results of our labors.

The effects of the pursuit of pomology are in the highest degree civilizing and elevating. Like the study of any other department of the productions of the Creator, these investigations are ennobling; they bring us into nearer relations with the all-wise author of our being, they teach us that the Omniscient and Omnipresent One has such comprehensive goodness, that while governing a universe, and caring for the happiness, present and eternal, of the souls of his nobler production, man, He has been also willing to descend to the consideration of his lowest creations, and that he has framed everything with the utmost care, and in the most perfect manner, and in consideration of the uses for which it was created.

This important study is not taught in our schools, nor am I aware of any agricultural college where Pomology is made a speciality. Its votaries are in a great measure self-taught, and acquire their information in part from reading, and we have but a few books, so we must learn, especially from observation, from studying the unprinted but ever open *book of nature*, which is always at had, and open for our investigation.

The best and only schools for the pursuit of these investigations are the Pomological Societies of our country, and they are an American idea, of which we may well feel proud, since they have wrought a good work for us, and through us have been of great service to the Pomology of the world. Before their formation the isolated investigator had scarcely a single printed page at his command, or with but one or two of the earlier printed works of his predecessors in this path of investigation; alone and unaided, or with very feeble rays of light to illuminate his path, he was obliged to grope his way among heaps of rubbish, and along an almost untrodden pathway. A little nursery scattered here and there over the country, and an occasional orchardist with more than usual intelligence and devotion to the investigation of the best varieties, and their culture, then constituted all that there was of Pomology, which, indeed, in these initial stages, could not be said to have a name, or even a real existence, much less a "local habitation." How different now! When every cultivator

of the soil, every holder of a town lot, may plant and cultivate his fruits advisedly and with a prospect of success, because he has the lights of experience derived from others who have worked out the problem and left their records for his benefit; and this is science!

From the nature of things, when a few observers were scattered over the country, struggling alone with many difficulties, the necessity for some united action, especially for comparing notes, was seriously felt, and as a remedy, by this united action and consultation, a few leading minds were at length able to come together and discuss the topics that engrossed their thoughts, and which constituted the basis of their pursuits, and also contained the germ of an important element of the wealth of the agricultural production of the country. In this way were our Pomological Societies instituted; growing out of this need which was seriously felt, they had their small beginnings; they were sometimes composed of a very small knot of nurserymen, or of orchardists, and they were organized as Fruit Growers Conventions, as Nurserymen's Conventions, or as Horticultural Societies; and they soon became very important institutions, and are now to be found pursuing their good work in almost every State of the Union.

The mission of these institutions has been to diffuse a knowledge of horticultural pursu ts, to cultivate and to refine the taste for good fruits, and more especially to point out to the tree-planter the best varieties and the best methods of treating them. Befc re we had these consultations of fruit-growers, an enterprising farmer who desired to plant an orchard either collected a number of seedling trees, many of which would prove nearly worthless, or if there were any nurserymen within reach, he would consult them, and take such varieties as they had to offer, and which they might recommend as "grafted or improved fruit." But even these were not always satisfactory, because, for want of sufficient consultation among themselves, and comparisons of the fruits which they were propagating, it often happened that a variety which had been introduced into a dozen different neighborhoods was cultivated under as many different names, so that it might occur to the most enterprising orchard planter that with a list of twenty names in his hand, he would ascertain, after years of labor and patience, that he had an orchard of but two or three varieties. Then came the blessings upon the devoted heads of the nurserymen; they were blamed for this disappointment—but it was not altogether their fault—such results could not then be avoided. Not so now; with the advance of Pomology, with accumulated light of continued observations, acquired in these consultations, and which no nurseryman or orchardist can afford to be without, and with the increased knowledge of the business, and with greater tact in noticing the smallest differences in leaf, and bark, and bud, and habit, of his young trees, our modern nurseryman, of course a member of some Pomological Society, can never long cultivate any variety under its synonims without detecting the similarity, in the various parts that are always subject to his scrutiny, though he may never have enjoyed the opportunity of testing the value of its fruit. For this essential and important character, he must be dependent upon others, until he can have had time to gather them from his own specimen trees. So the orchardist,

constantly has to take new varieties on the faith of others, and they may sometimes be very differently situated as to soil and climate, and with all his efforts and with long patient waiting, he may be sadly disappointed in the result after planting varieties that are highly recommended in other situations. All these things are learned and diffused by our pomological societies, assembling at intervals with their congresses of fruits; and had nothing been accomplished by our convening thus with our fruits than to unravel the maze of synonyms that made such sad confusion, a great work would have been done to reward us for the labor performed, and for the thought and time bestowed upon the subject. But we have done more, and of a most practical kind of work; we have rendered to one another and to the world prompt reports of the value of newly introduced varieties of different fruits, we have brought into notice many new varieties, we have revived older sorts that had been overlooked, we have sifted the lists again and again, excluding those that are inferior; and still further, we have endeavored to ascertain and to a considerable extent we have ascertained the influence of soil upon varieties, so as to make out a sort of geological chart for pomology.

Our own association, the *Ohio Pomological Society*, is only one of several similar organizations; but as it claims the honor of being the oldest in the country, and as it is *ours*, it may be well to present a brief outline of its history, for many of its early supporters have passed away from the scenes of their labors, and the majority of those who now take an active part in our deliberations have come to share its honors and benefits as well as to bear its burdens, in this latter day. Though long in the field, and productive of great good, we have never been pretentious, preferring the by-ways of unobtrusive usefulness, rather than the dazzling display of an ad captandum effect.

After considerable correspondence by the gentleman who still so admirably fills the office of Secretary to our Society, aided by others who were interested in fruit-growing, in different parts of the State, a Convention of *Fruit-Growers* and *Nurserymen* was assembled at Columbus on the 29th of September in the year 1847. The session lasted two days, during which a large amount of work was done, much valuable information was collected, and so favorably were the members impressed with the usefulness of the association, and the importance of making it a permanent institution, that a committee was appointed to report upon an organization, a large State Fruit committee was nominated, and a valuable report of the proceedings of the meeting was published.

A second session was held, with like good results, in September, 1848, leaving a valuable Report; and a third session convened in December, 1849, which kept up the association, and continued the good work, though it was not until the fourth session that a regular organization as a Pomological Society, under a Constitution, was effected. Still, we have a claim to being considered the oldest *State Pomological Society*, and have been issuing our Reports periodically since the year 1847

One of the valuable features of our Society is the institution of an *Ad Interim Committee*, who are subject to call for consultation at any period during the recess between the regular meetings of the Society, when the fruits of the season in any part

of the State may appear to claim attention and investigation. Much of the best work of the Society is thus intrusted to this committee, who report to the next meeting, and it is important that you should be careful to select your most energetic as well as your best informed members for this service; the officers of the Society are, *ex officio*, attached to this committee. In the present state of our finances, I would suggest that the Society authorize this committee to continue its valuable services, and to draw upon the Treasury for expenses incurred.

OBJECTS.

It will be apparent to every one that such societies, and such objects and pursuits, must be of the deepest interest to all nurserymen as well as to all orchardists—to the professional man and to the amateur; nor should there be any difference of interest in the two classes, both of which are engaged in the same pursuit, that of producing and meliorating the choicest fruits of the earth. The nurserymen more particularly multiply the individual trees of a variety, while the other class only plant and cultivate them in their orchards and gardens; but the former are also planters and fruit-growers, for every nurseryman will test the fruits he is propagating as soon as practicable, that he may know the correctness of the stock he is furnishing to his customers, and this he should have the greatest facilities for performing in the specimen trees upon his grounds. It also happens, not unfrequently, that the nurseryman grows into the orchardist, with the advancement of his trees. One of the most extensive fruit-growers of my acquaintance, systematically transforms every block of trees he produces into an orchard, by leaving certain trees in the rows where they were produced, and which from the first he has designed for his fruit-bearers, and trimmed and trained in such a manner as to come into bearing almost as soon as the remainder of the nursery has been sold and removed.

We have great reason to congratulate ourselves upon the advantages that favor us in these progressive strides which Pomology has made in our day. The diffusion of knowledge upon our favorite topics, chiefly owing to the efforts of those engaged in these societies, has now abrogated many of the difficulties that surrounded the paths of our early nurserymen and fruit-growers.

The first devotees to pomology met with difficulties, at the outset of their career, that can hardly be conceived by those now entering upon a career of pomology. They had to produce their own stocks, from seeds and cuttings, and the sources from which these were derived were exceedingly limited; the number of varieties in the country was very small. Nor was this all; before the united action of the scattered pomologists of the country had been able to reduce system and order out of the chaos that existed with regard to the nomenclature of varieties, every nurseryman and every orchardist, of course, was liable to plant and cultivate a single variety under a great many names. Some favorite fruit having been introduced into several different neighborhoods by pioneer emigrants from the older States, it was christened anew by its admirers in every township where it was grown, so that the nurseryman, in those days of saddle-bag collections, when riding over the country in pursuit of desirable scions,

calling from house to house where a few orchard trees attracted his attention, would often procure his grafts of the same variety from several persons, under their local names, without suspecting that these would one day produce identically the same fruit. His customers, the early tree planters, desirous of having an assortment, and depending upon the nurseryman's lists, was thus liable, when intending to plant a dozen sorts, so as to have a succession and a variety, to find, after a lapse of ten or twelve years, that his orchard was composed of only two or three sorts. Fortunately for many nurserymen of even a late period, the neglect of many of the millions of trees that have been planted annually, causing the utter destruction of a majority, has covered up or lost in oblivion numerous errors of this sort, not to speak of the willful mistakes and deceptions that have been practised upon the unsuspecting farmers by those unprincipled knaves who have represented themselves as traveling agents of some of the great nurseries of the East; to which source we have hoped to look for light and knowledge, and from which should flow liberality toward their younger followers in the West.

One of the most interesting objects of inquiry in our pomological convocation, is the limits within which any variety of fruit may be cultivated with entire satisfaction, and thus eventually to trace the boundaries of its successful culture. This, I am aware, is a difficult task, and one which will require a long series of observation, and many repeated consultations of many intelligent observers, united in many different societies, scattered over our extended country, which embraces a most varied soil and climate. It will be found, with many sorts, as it has already been discovered of several, that though considered of great value in one section of the country, they will be condemned in another region; thus we find that with a change of latitude, many of the winter apples of New England, which are celebrated for their long keeping properties, have become autumn varieties of little value in the Western and Southern States, to which they have been transplanted. One of the great difficulties in solving this problem arises from the diversified taste of different observers, for with all of us, the flavor of a fruit, and its impressions upon our palate, constitute a very important element in our decisions, though the several other characters, of productiveness, &c., are always to be duly considered.

The American Pomological Society, a truly national organization, embracing all the States and Territories, has taken the lead in the endeavor to make out lists for general culture, and have experienced the greatest difficulty in this desirable labor. The difficulty has always been increased in the ratio of the regions represented at the meetings; at first, when the large majority of the members were from within a limited range of country, the lists were made out with little difficulty, but, as the attendance upon the meetings of the society became more general, embracing representatives from several States, it was very soon discovered that some of the fruits which were recommended for *general cultivation* had been tried in other regions and found to be inferior and unworthy. On the other hand, the lists of rejected varieties which had been published by the society were found to contain sorts that, in more fertile soils, were among our most desirable fruits, and, on account of their many good prop-

erties, were considered indispensable. Further, when we came to compare notes with those who had been for years endeavoring to make out these lists, we were surprised to find that many of our well known varieties, some of which are found in almost every county, were not named, even in the lists that "*promise well.*"

The National Society, with its reports from so many sections of the country, had superior advantages to any local societies in an investigation of this kind, but to pursue the matter and bring out the best possible results, a large committee was appointed to collate and compare lists of varieties, which were tabulated for the several States, and sent out for further amendments, which it was hoped would bring out the most valuable information.

Our own society, as well as those of some other States, have been engaged in similar investigations, with excellent results, for our own regions, and, in view of the importance of considering the influence of different geological formations upon the several varieties of fruits, our members attempted an analysis of these lists by sub-dividing our State according to the different rock formations, into five regions. This was the commencement of a great work—only the beginning, of valuable conclusions, which we hope yet to reach, after long continued observations and repeated consultations—we have recorded our conclusions, the report is before the society, and it may form an important part of the work of this session to revise and amend it.

It may be well for us to ask whether there may not be something else for us to know, something for us to study and to investigate, beyond the knowledge of external and inherent qualities of the fruits which are furnished by our favorite trees. Pomologists should know all about their trees, not merely how to produce them from the seed, how to propagate them, how to ingraft and thus multiply favorite varieties. They should not only understand the most perfect methods of culture and treatment of their pets, but they should study to know the laws of vegetable physiology to which their trees are subject—they must master the mysteries of plant-life. Upon these topics many erroneous views have existed among orchardists, and too much, ignorance still prevails among us. Thus it has been seriously questioned whether grafting and budding our trees does not diminish their vitality, or at least their hardiness, as in the case of the peach, among which we sometimes find that the most inferior seedling varieties escape the rigors of our climate, while the choice fruits are all destroyed in the bud, and fail to blossom. Now this only shows that there are differences in the power of withstanding frost, and that the trees producing the luscious fruits which we prefer for our tables, are more susceptible to cold and to sudden changes of temperature than the miserable seedings that have a tendency to run back to the original type.

Now it is clear, that as a general proposition, the grafting or inocculation can have no effect in making the tree tender, since the growth, resulting from the inserted bud, partakes of all the peculiar properties of the plant whence it was removed—it is only transplanted into a new stock, and like a cutting or a seed placed in the ground, its growth is modified only by the amount of crude sap furnished by the roots; it matters not whether these be original or adapted; and this crude sap is transformed into the respective products of the variety, within its own limits, above the insertion of the

graft. The influence of the stock is confined to the amount of sap it is able to furnish to the branches above, rather than to the nature and qualities of the products there generated. The leaves, the flowers, and the fruit, are always those peculiar to the scion, and in nowise influenced by the stock, except as above stated, by the amount and condition of the supply furnished from the soil. The variations often observed in the qualities of a single variety of fruit, grown upon a similar soil, perhaps in the same orchard row, and which have been attributed to the influence of the stocks upon which the different trees were grafted, should rather be referred to the existence of sports in the variety; such sports are known to exist in many cultivated plants, and are even observed to some extent in those that are still in a state of nature. That certain fruits are sometimes found to be a little more or less sweet or acid in different trees, has been attributed to their having been grafted upon stocks that would have furnished sweet or sour fruits;—this is all a mere assumption, and should rather be referred to the influence of the soil in which they are situated, or to some other cause. I am aware that there are several statements that would appear confirmatory of the theory that stocks do influence the graft in this way; that the Bellefleur apple grafted upon the Sweet Bough was less acid than usual; that the Prior's Red apple grafted upon the Janetting, was more prolific, etc., but the conclusions are not justified, and at least need further confirmation before we can adopt them as safe conclusions. If any one desires to convince the pomological world, which, like the rest of mankind, is but too credulous, let him institute a series of experiments, and report the results. In the mean time, some of us will treat all these reports of isolated cases as at least of a very doubtful character, or we shall refer them to other well known causes.

That the stock may affect the fruit is admitted, but not in the way generally claimed. The influence must depend, as above stated, upon the amount of sap furnished, and the freedom with which it is handed over to the scion; and also to the freedom or restriction with which it is returned from the scion, in descending, as proper juice, to make up the tissues of the tree. We hear of stocks that are congenial, and otherwise;—to take a very strong case of uncongeniality, look at the result of inserting a pear scion upon a thorn or apple tree stock. If it has been well established in the ground when cut off and grafted, a large supply of the crude sap will be furnished to the growth of the scion, which will appear very satisfactory, but the descending sap, in the graft, when it meets the stock, is uncongenial to it—the union of the two kinds of wood is imperfect; the new growth below the graft is very small, especially in the thorn; the scion soon overgrows the stock, and there is an interrupted descent of the sap. This is an unnatural state of affairs—the union does not make a unit—the new limb has an interrupted connexion with the soil below, since its buds do not have their new layer of woody fibers in free communication with it; there is a constriction placed upon them at the junction of the two different kinds of wood; the life of the new tree is threatened, and the universal law of vitality comes into play, which provides for the procreation of the species as a compensation for the failing vitality of the individual; the responsibility of maintaining its existence is thrown upon it, and morphology comes in to transform the wood buds into blossoms and fruit, that seeds may be produced to

perpetuate the plant, which has thus had its existence threatened by this interruption of its reflex circulation. Hence we always find a tendency to early fruitage or premature productiveness in grafts that have been inserted upon uncongenial stocks. We also find an influence is exerted by this uncongeniality upon the character of the fruit itself, which is often larger and more luscious under such circumstances than where the scion and the stock are more nearly alike, as in the majority of cases of grafting upon what are called free stocks. One of the chief advantages of cultivating dwarf pears is claimed to be that the fruit is larger and more luscious. Instead of the pear being more austere and astringent, and inedible, it has its good qualities increased and not diminished nor rendered unpalatable, as should have been the case had the quince stock infused into the scion any of its peculiar qualities to affect the fruit. We are forced to adopt the views of modern physiologists—such as those of Schleiden and Harvey and others—and conclude that the transformations of the sap into the several tissues must transpire in each several part of the plant separately, and not, as formerly believed, in the leaves alone, to be transmitted from them to the other organs.

The views of Harvey as to the wood growth constituting, as it were, by its continuous or connected lignin cells the *roots* of the buds, and connecting them with the soil, as the radicle does the germinating seed, are of the greatest importance *to tree-growers*, who will thus learn to value buds and appreciate the importance of their appendages—the leaves. An enlightened cultivator will never remove all *the side* branches from a young nursery tree, much less will he rub off the leaves from the annual shoot at midsummer in hopes of making it grow higher to produce *more new* foliage. On the contrary, he will encourage every leaf and every lateral branch, only subordinating the latter to the leader, when he knows that each of the buds is a separate existence, having its own connexion with the soil, and when he observes that by such a mode of treatment of his young trees he will have a satisfactory result—a stout stocky tree, the stem of which is a rapidly increasing cone, when traced downward from the tip, though perhaps somewhat knotty, if trimmed up to suit the eye of the customer, instead of a slender wand, without spot or knot or wrinkle, but *tall*, smooth and pliable, but also nearly worthless, as they are when crowded and trimmed up and forced to a single shoot, and grown as tall as possible, for they are then unable to support their own weight, and bending over, or ready to bend over, when they are deprived of the support of their fellows, and set out in the orchard. Such a nurseryman will, by observation of the effects of the laws of nature, soon learn that it is better to pinch the tips of the laterals, so as to keep them in subjection while doing their important work of building up the tree; and further, that there is a certain period in the life of the nursery tree, when the lower branches may be gradually removed, so as not to be so much missed, and so that the descending fibers from above will cover the wounds and produce the true desideratum for the tree-planter—a stocky stem, with branches placed at a sufficient hight from the ground, and below them also, a smooth stout stem, without those freshly made knife-scars that so often disfigure the young trees that are given to us for planting in our orchards, and which often produce ugly blemishes, and may seriously affect the vitality of the tree, which, for some time after transplanting,

is not in a condition to recuperate itself and to heal these wounds. Lest some of you may not have paid sufficient attention to this point of practice, I will refer you to some very interesting experiments that have been conducted by a committee of the Missouri Horticultural Society, to ascertain the period when the cambium layer was in most active formation. Dr. Claggett, of St. Louis, peeled off the bark from young trees once a week during the summer, and noted the results; he found that those peeled before the 9th of June did not have it reproduced—they all died; those peeled from the 16th to the 23d of June had the most perfect restoration, and those which were stripped after this period, when the bark would not readily leave the wood, made little or no effort to reproduce the parts. Now these dates apply only to that locality and to that particular season, and to the condition as to growth of those particular trees upon which the experiments were tried; but if the observations had been extended so as to note the status of the annual growth by extension of the subjects operated on, it would doubtless be found that the early failures at reproducing the bark were upon trees that had just made their first shoots in the early summer, and before these had begun their reflex growth of a layer of *cambium*, that constitutes the wood and bark of the annual layers, that those in which the experiment was successful were treated after the terminal bud had been formed, indicating that the growth by extension had nearly or quite ceased for the season, and that those which had failed at a later period were done after the descending growth had been made for the year. So it is more important to note the condition of the tree, than the advance of the season as indicated by the almanac, and so in practice in the nursery, where our trees may be kept in a growing state, by proper cultivation, for a longer period than in the orchard, the time is extended when the removal of laterals may be safely practiced with the desirable results of healing the wounds as rapidly as possible, and closing them the same season.

The effect of removing these lateral growths is well known in vine culture. By concentrating the growth in one main shoot, a larger and more productive cane is produced for the next years' fruitage than when several are allowed to grow, all of which may be more or less feeble. A vigorous cane, in the season of most energetic growth, will throw out laterals from almost every bud and will sometimes even bifurcate at the extremity. The careful vine-dresser will practice summer pruning and check these laterals so as to strengthen the cane that he is growing for the next season's fruitage. This he will do to the extent that he desires to cut the cane for bearing wood. Generally these laterals are broken out close to the axil of the leaves from which they sprang, but we are recommended to pinch them at their first leaf so as to leave one bud on each, so that, in case of any accidental breaking of the cane above them, this bud on the lateral may start instead of that which is lying dormant in the axil of the leaf, and which is destined to furnish the fruit the next year. Mr. Husman, of Missouri, has very judiciously recommended a similar treatment of the laterals on the bearing branches of the vine, and he practices a most admirable plan of shooting-in his fruit bearing shoots in such a way and at such a period as to force out laterals from them for the sake of making them supply new foliage during the summer, to

sustain and nourish the fruit. This he does by pinching the fruit-bearing shoots very early in the season, so soon as the bunches of blossom buds appear. By this means he forces out laterals from the buds opposite to each bunch, and, later in the season, these also are pinched at their first leaf. Mr. Husman claims, that by this method he produces larger and better foliage, and that he can keep up a succession of healthy leaves during the season; and, further, that these evaporating surfaces for elaborating the sap are in juxtaposition to the fruit, just where they should be, for we know the value of the leaves to healthy growth, and can guess their importance also in developing the buds at their bases.

Some of our vine-growers, by judicious pinching, will produce a strong cane and also have it furnished for a considerable portion of its extent, with spurs for fruiting, and all in one season's growth; this is doing two years' work in one, and requires a strong vine, but it may sometimes be desirable to work off the surplus energy of the plant in this way and prepare it for bearing fruit upon these spurs the next season.

It had been my intention to have presented some views upon the subject of producing new varieties of fruits from the seed. This would have involved a discussion of the very interesting questions of *crosses* and *hybrids*, but its extensiveness will prevent its introduction upon this occasion, when your patience has already been severely taxed. For the present you must be content with a fraternal caution, not to allow yourselves to be deceived by all the reputed *hybrids* that may be presented to your notice, and a recommendation to cultivate no varieties in which the plant is not perfectly healthy and vigorous, no matter how attractive the fruit.

I shall therefore now close, after directing your attention to some matters of business.

Election of Officers.—Our constitution in section 6th prescribes the annual election of the officers of this Society. A change was introduced by A. H. Ernst, who suggested it while presiding at the December meeting 1854, (as appears in page 19 of the sixth Report) altering the regular meetings from annual to biennial, and thus the elections ceased to be held annually, but I find no record of any alteration of the constitution in accordance with this custom of holding over for two years. I therefore suggest, that the Society would act more in conformity with its organic law by holding its elections annually, and I have appointed a committee in accordance with this view of the case, who will, I trust, furnish us with a list of candidates worthy of our ballots.

TREASURER'S REPORT.

You will be gratified to learn that owing to favorable circumstances for the publication of the last Report, the society has been able to husband its slender resources, while at the same time our valuable discussions have been presented to the thousands of readers of the State Agricultural Report. By this presentation of the results of our labors to the reading agriculturists of the State, we fondly hope that our list of members will be largely increased from year to year, to the great advantage of all.

Let me urge upon each of you to appeal earnestly to your neighbors and friends on behalf of this society, induce them to unite with us in the good work we have under-

taken, and if they can not be persuaded to take a part with us in the labor to be performed, induce them, at least, to become contributing members.

Neither the labor of the performance of such an undertaking, nor the glory that must ensue from its valuable results, should be allowed to continue the exclusive privilege of a few devoted men. *Science and Art*, as well as their excellent results, are the heritage of every son of our glorious republic, and each one of them should feel in duty bound to lend his hand to forward some good work for the common good.

STRANGERS AND GUESTS.

Rejoice with me, my fellow laborers, in this vineyard; you, now too few, alas! who have continued these many years, sometimes with little help, and almost without hope of success. Rejoice with me at the prospect before us. Here, in a new arena for our society, we find that our friends and co-laborers have stirred up a noble spirit of love and welcome among their neighbors to greet our approach. Such a manifestation is cheering to our hearts, and may be taken as an earnest of the valuable accessions to our ranks which we may expect among them.

With me too, extend the hand of a warm welcome to our friends from "over the border," who had been induced to come to our annual love-feast, with their offerings to *Pomona*, who is to them so gracious in her gifts as almost to make us jealous of her favored proteges. Not only has Michigan sent her sons, but here we are rejoiced to see delegates from the rich plateaus of Indiana, and we had hoped also to have seen some from the broad savannahs of the glorious Prairie State, on the one hand, and from the billowy swells that flank the Alleghenies on the other side of us, progressive cultivators to aid us with their accumulated stores of observation in our favorite department. In conclusion, allow me to thank you all for your patience.

In the name of the Ohio Pomological Society, I thank you all for the beautiful welcome you have given us, for the interest you have manifested in our welfare. The chill of your boreal atmosphere, now even *hyperborean*, yields, as melts the hoar frost 'neath a vernal sun, when it is warmed by such demonstrations of fraternal sympathy as those which greet and cheer us here on every side. Our young sister, the Horticultural Society of Toledo, has become at once matronly and majestic, when she donned the robe and assumed the office of hostess to her senior visitant, the Ohio Pomological Society. May an honorable and loving rivalry in good works long continue to commemorate this event.

NOTE.—During the sessions we had visitors from Illinois, from Pennsylvania, and from New York.

OFFICERS AND MEMBERS

OF THE

OHIO POMOLOGICAL SOCIETY, 1864.

President—DR. J. A. WARDER, Cincinnati.
Vice-President—J. AUSTIN SCOTT, Toledo.
Sec'y and Treasurer—M. B. BATEHAM, Painesville.

G. W. CAMPBELL, Delaware,
S. B. MARSHALL, Massillon,
J. R. MILLER, Springfield,
F. R. ELLIOTT, Cleveland,
} *Members of the Committee ad interim with the above Officers.*

Jos. Perkins, Cleveland.
Dr. E. Taylor, "
S. D. Harris, "
Capt. Danl. Stewart, West Cleveland.
A. B. Buttles, Columbus.
A. G. Hanford, "
R. G. Hanford, "
H. C. Noble, "
Wm. G. Deshler, "
J. L. Gill, "
J. L. Stelzig, "
Geo. Gere, "
Jas. Westwater, "
R. Buchanan, Cincinnati.
Wm. Heaver, "
S. S. Jackson, "
R. B. Bowler, "
D. B. Pierson, "
Wm. F. Irwin, "
J. P. Foote, "
Geo. Graham, "
Wm. Resor, "
Joseph Longworth, "
J. K. Green, "
S. L. L'Hommedieu, "
Wm. H. Clement, "
Robert Burnett, "
Robert Hosea, "
Chas. B. Foote, "
James Hall, "
M. McWilliams, "
F. Pentland, Cincinnati.
Thos. W. Johnson, "
Dr. Jos. Taylor, "
E. Woodruff, "
Wm. Stoms, "
J. J. Cook, "
R. W. Steele, Dayton.
Jacob Pierce, "
J. T. Worthington, Chillicothe.
J. T. Warder, Springfield.
Wm. S. Imley, Zanesville.
J. W. Plumley, Marietta.
W. S. Ward, "
Wm. D. Kelley, Ironton.
T. S. Humrickhouse, Coshocton.
H. H. Myers, Canton.
Dr. H. C. Beardslee, Painesville.
Jesse Storrs, "
Dr. N. S. Townshend, Avon.
W. E. Mears, Milford, Clermont Co.
J. Edgerton, Barnesville.
F. G. Carey, College Hill.
E. G. Ricker, "
T. V. Petticolas, Mt. Carmel.
J. M. Millikin, Hamilton.
John Laughry, Rockville, Adams Co.
D. Kenyon, " "
Edgar Westervelt, Galena.
Thos. Gardner, Quaker Bottom.
H. N. Gillett, "
Geo. Dana, Jr., Belpre.

Israel Hall,	Toledo.
D. D. Gardner,	"
Chas. Lenk,	"
A. M. Maddocks,	"
J. Hobert,	"
Frederick Bissell,	"
Dr. S. S. Lungren,	"
W. J. McMillan,	"
A. W. Barlow,	"
W. E. Earl,	"
Wm. Rawle,	"
F. A. Jones,	"
H. H. G. Smith,	"
Geo. Baker,	"
A. Fahnestock,	"
M. Shoemaker,	"
P. H. Shaw,	"
F. L. Nichols,	"
Henry Bennett,	"
E. T. Mortimer,	"
W. W. Jones,	"
Geo. E. Pomeroy,	"
Sam'l Bement,	"
S. A. Raymond,	"

N. L. Woods, Smithfield.
Jos. Morris, Cardington.

D. C. Richmond,	Sandusky.
H. B, Lum,	"
H. T. Dewey,	"
W. Z. Barney,	"
Jno. McElvy,	"

J. C. Coe, Sidney, Shelby Co.
Geo. Hapgood, Warren.
Lewis Nicholson, East Rockport.
Dr. J. P. Kirtland, "
F. G. Hill, Dallasburg, Warren Co.
Henry Hefflebower, Montclovia, Lucas Co.
R. J. Black, Bremen, Fairfield Co.
Chas. Carpenter, Kelley's Island.
Chas. Kelley, "
H. P. McMaster, Leonardsburg.
H. R. Kinney, Portsmouth.
Stephen Boalt, Norwalk.
Giles Boalt, "
E. S. Stowe, Milan.
Geo. Powers, Perrysburg.
Jas. Donipace, "
E. Luce, Ashtabula.
A. D. Strong, "
Mr. Wild, Brownhelm, Lorain Co.
T. P. Johnson, Ostorn, Greene Co.

TREASURER'S REPORT—1863.

Balance on hand, from last report	$50 97	
Received at Com. meeting in Cleveland	10 00	
" fees of members by President	24 00	
" " " by letter, &c.	8 00	
" " " at annual meeting	50 00	
		$142
Paid Expenses of President for revising 10th Report	$ 5 00	
" For covering and binding Reports	10 75	
" Postage on 200 copies mailed	4 00	
" Wrapping and letter-paper	2 00	
" Expenses at Com. meeting in September	2 50	
" Envelopes and postage on circulars	5 50	
" Letter postage for the year	2 50	
" Expenses, drayage, &c., at annual meeting	4 00	
" Printing circulars for do.	3 75	
		40 00
March 1, 1864. Balance on hand		$102 97

☞ *Members of the Society* who have not paid their annual fee ($1) for 1863, are requested to remit the same by mail to the Treasurer; and if they do not expect to be present at the annual meeting, they can at same time remit for the year 1864.

It is proposed to revise the Constitution of the Society, at the next annual meeting; and provide for *indexing* the last three or four Reports, so that they may be bound in one volume, for convenient reference.

Observe that the Secretary and Treasurer has changed his residence from Columbus to *Painesville*, O.

Address, M. B. BATEHAM,
Painesville, O.

April, 1864.

LAWS OF OHIO

FOR THE

ENCOURAGEMENT OF AGRICULTURE.

AN ACT

For the encouragement of Agriculture.

SECTION 1. *Be it enacted by the General Assembly of the State of Ohio*, That whenever thirty or more persons, residents of any county or district embracing two counties of this State, shall organize themselves into a society for the improvement of agriculture within said county or district, and shall have adopted a constitution and by-laws, agreeably to the rules and regulations to be furnished by the Ohio State Board of Agriculture, hereinafter created, and shall have appointed the usual and proper officers; and when the said society shall have raised and paid to their treasurer, by voluntary subscription, or by fees imposed upon its members, any sum of money in each year, not less than fifty dollars; and whenever the president of said society shall certify to the respective county auditors, the amount thus paid, attested by the oath of the treasurer before a magistrate, it shall be the duty of the said county auditors, embraced within the district in which such society shall be organized, to draw an order on the treasurer of the respective county, in favor of the president and treasurer of said society, for a sum equal to the amount thus raised; provided it does not exceed half a cent to each inhabitant to the said county, upon the basis of the last previous national census, but not to exceed in any county the sum of two hundred dollars, and it shall be the duty of the treasurer of the said county to pay the same.

SEC. 2. That it shall be the duty of the several county or district societies which may be formed under the provisions of the preceding section, during the continuance of this act, annually to offer and award premiums for the improvement of soils, tillage, crops, manures, implements, stock, articles of domestic industry, and such other articles, productions and improvements, as they may deem proper, and may perform all such acts as they may deem best calculated to promote the agricultural and the household manufacturing interests of the district and of the State; and it shall also be their duty, so to regulate the amount of premiums and the different grades of the same, as that it shall be competent for small as well as large farmers to have an opportunity to compete therefor; and in making their awards, special reference shall be had to the profits which may accrue, or be likely to accrue, from the improved mode of raising the crop, or of improving the soil or stock, or of the fabrication of the articles thus offered, with the intention that the premium shall be given for the most economical mode of improvement; and that all persons offering to compete for premiums, on improved modes of tillage, or the production of any crops, or other articles, shall be required, before such premiums are adjusted, to deliver to the awarding committee a full and correct statement of the process of such mode of tillage or production, and the expense and value of the same, with a view of showing accurately the profits derived or expected to be derived therefrom.

SEC. 3. It shall be the duty of each county or district society to publish annually a list of the awards, and an abstract of the treasurer's account, in a newspaper of the district; and to make a report of their proceedings during the year, and a synopsis of the awards for improvements in agriculture, and household manufactures, together with an abstract of the several descriptions of those improvements, and also make a report of the condition of agriculture in their county or district, which reports shall be made out in accordance with the rules and regulations of the Ohio State Board of Agriculture, and shall be forwarded to the State Board at their annual meeting in December, in each year; and no subsequent payment shall be made from the county treasurer, unless a certificate is presented to the auditor from the president of the State Board, showing that such reports have been duly made.

SEC. 4 enumerates the Incorporators.

SEC 5. It shall be the duty of said Board, or any ten of them, to meet in the city of Columbus, on the first Wednesday of April, after the passage of this act, and to organize by appointing a president, secretary and treasurer, and such other officers as they may deem necessary also determining by lot the time that each member shall serve, so that the term of service of one-half of the members shall expire annually, on the day of the annual meeting in December; and the president shall have power to call meetings of the Board whenever he may deem it expedient.

SEC. 6. There shall be held in the city of Columbus, on the first Wednesday after the first Monday in December, an annual meeting of the Ohio State Board of Agriculture, together with the president of each County Agricultural Society, or other delegates therefrom, duly authorized, who shall, for the time being, be ex officio members of the State Board of Agriculture, for the purpose of deliberation and consultation as to the wants, prospects and condition of the agricultural interest throughout the State; and at such annual meeting, the several reports from the county societies shall be delivered to the president of the Ohio State Board of Agriculture; and the said president and delegates shall, at this meeting, elect suitable persons to fill all vacancies in the Ohio State Board of Agriculture.

SEC. 7. And it shall be the duty of said Board to make an annual report to the General Assembly of the State, embracing the proceedings of the Board for the past year, and an abstract of the proceedings of the several agricultural societies, as well as a general view of the condition of agriculture throughout the State, accompanied by such recommendations as they may deem interesting and useful.

SEC. 8. That the act to authorize and encourage the establishment of agricultural societies in this State, and for other purposes therein set forth, passed March twelfth, one thousand eight hundred and thirty-nine, be and the same is hereby repealed; provided the acts done, obligations incurred, and rights acquired under the provisions thereof, shall remain in no wise altered or affected by this act.

AN ACT

To amend an act entitled "An act for the encouragement of Agriculture," passed February 27, 1846.

SECTION 1. *Be it enacted by the General Assembly of the State of Ohio*, That the "Ohio State Board of Agriculture" shall consist of ten members, five of whom shall constitute a quorum.

SEC. 2. That Allen Trimble, M. L. Sullivant, Samuel Medary, Darius Lapham, A. E. Strickle, Arthur Watts, M. B. Batcham, John Codding, Jared P. Kirtland and I. Moore, be continued members of the Board, the term of service and the mode of appointing their successors to remain unaltered by this act.

SEC. 3. That the sum of two hundred dollars be and the same is hereby appropriated from the treasury for the use of the Board; and an account of the expenditures of the Board shall be included in the annual report of the Board to the General Assembly.

SEC. 4. So much of the law to which this is an amendment, as conflicts with the provisions of this act, is hereby repealed.

AN ACT

To create a Permanent Agricultural Fund for the State of Ohio.

SECTION 1, *Be it enacted by the General Assembly of the State of Ohio*, That there shall be created, from the several sources hereinafter mentioned, a fund which shall be known as the "State Agricultural Fund."

SEC. 2. That the minimum amount authorized to be charged by county auditors for permits under the law passed February eighth, one thousand eight hundred and thirty-one, entitled "an act to regulate public shows," shall be and is hereby increased to twenty dollars, and that one-half the revenue in each and every county, derived from such source, be set apart to the "State Agricultural Fund," to be paid over by the county treasurer to the Treasurer of State, at their settlements with the Auditor of State, as other moneys collected for that purpose now are; and that the other half remain, as now provided by law, for the use and benefit of the common school fund.

SEC. 3. That whenever any real or personal property shall escheat to the State, under the eighth and ninth sections of an act entitled "an act regulating descents and the distribution of personal estates," passed February twenty-fourth, one thousand eight hundred and thirty-one, and all such as have heretofore so escheated under the provisions of said law, and which have been taken possession of under the law entitled "an act concerning escheated lands," passed February twenty-five, one thousand eight hundred and thirty-three, shall be taken possession of in the name of the State, by the county auditor of the county in which such property may be found, and by him sold at public auction, at the county seat of such county, to the highest bidder, after having given thirty days notice of such intended sale, in some newspaper printed within the county.

SEC. 4. The court of common pleas shall, on the application of the county auditor, appoint three disinterested freeholders of the county to appraise such real property, who shall be governed by the same rules as appraisers in sheriff's or administrator's sales; and the auditor shall sell such property at not less than two-thirds its appraised value, and may, at his discretion, sell the same for cash, or one-third cash, and the balance in equal annual payments; the deferred payments to be amply secured; and, upon the payment of the whole amount of consideration money, shall execute a deed to the purchaser, in the name and on behalf of the State of Ohio.

SEC. 5. All moneys arising from sales under this act, shall be paid over by the county auditor to the treasurer of the county, to be by him accounted for and paid into the State treasury at his annual settlement with the Auditor of State, as other moneys collected for State purposes for the use and benefit of the "State Agricultural Fund."

SEC. 6. The fund hereby created shall be at the disposal of the State Board of Agriculture, for the improvement of the agricultural interests of the State, in such manner as they may deem most conducive to that object, until otherwise provided for by legislative enactment; and shall at all times be held subject, upon such property being reclaimed by any heir, to the payment to the purchaser of the State, of the original purchase money and legal interest, to the time of such reclamation.

(Sections seven to ten inclusive relate to the use of escheated lands in the city of Cincinnati, for the benefit of the "house of correction," established there.)

SEC. 11. All acts and parts of acts inconsistent with this act are hereby repealed.

Passed February 8, 1847.

AN ACT

To protect agricultural fairs and fair grounds.

SECTION 1. *Be it enacted by the General Assembly of the State of Ohio*, That it shall be lawful for any justice of the peace, on the application of any of the officers of any State, county, township, or any independent agricultural societies, or industrial associations, to appoint a suit-

able number of special constables, to assist in keeping the peace during the time when such society shall be holding their annual fairs, and make an entry in his docket of the number and names of all such he shall appoint.

SEC. 2. All such constables so appointed shall have all the power of constables to suppress riots, disturbances and breaches of the peace; they may, upon view, arrest any person or persons who may be guilty of violating any of the laws of the State, may pursue and arrest any person fleeing from justice in any part of the State; to apprehend any and all persons in the act of committing any offense against the laws thereof, and may, upon reasonable information, supported by affidavit, procure process for the arrest of any person or persons who may be charged with a breach of the peace, and forthwith bring such person or persons before the competent authority, and enforce all the laws for the preservation of good order.

SEC. 3. No person shall be allowed to keep any shop, booth, tent, wagon, or other carriage, vessel or boat, or any stand or table for the sale of any spirituous or other liquors, or sell or expose to sale, give, barter or otherwise dispose of, in or near such shop, booth, tent, wagon, or other carriage, vessel, boat, stand or table, or in any other way or place, any spirituous or other liquors, at or within the distance of two miles from the place where any such agricultural fairs are held.

SEC. 4. That any person or persons who shall be guilty of a breach of this act, and shall be notified by any one of the officers authorized to make an arrest or seizure, or by any other person, that he, she or they are violating the law; and if, after such notice, such person shall continue in such violation, he, she or they shall forfeit and pay for such offense, a fine of not less than five nor more than fifty dollars, to be paid over to the treasury of such agricultural society where the offense was committed; and any judge of the court, sheriff, coroner, justice of the peace of the proper county, or any constable of the proper township, or the constables specially appointed, shall, upon view or information, without warrant, apprehend any person so offending, and seize such booth, tent or wagon, or other carriage, stand, vessel or boat, selling spirituous or other liquors, and convey the same to a place of safe keeping, and take the person so offending before some officer having competent jurisdiction, together with an inventory of the things so seized, and the officer before whom such alleged offender shall be brought, shall proceed forthwith to inquire into the truth of the accusation, and if true, shall enforce the penalties of this act.

SEC. 5. If the accused shall fail to pay such fines as shall be assessed, together with all of the costs of proceedings, including the necessary expenses of such seizure, the said officer before whom such offender was tried, shall forthwith issue a venditioni exponas, commanding any constable of the township in which such inquiry shall be held, to make the fine and costs, necessary expenses, and costs of execution, by sale of so much of the property as shall be necessary therefor, and make return thereof within ten days thereafter.

SEC. 6. That in the execution of the venditioni exponas, the said constable, at least ten days before the sale, shall advertise the property to be sold at two of the most public places of the township, where the same is to be sold, at one of which places, to be designated in the notice, between the hours of ten o'clock A. M. and four o'clock P. M., said sale shall be held; said constable first selling or offering for sale the articles which the offender brought on to the ground for traffic, and the overplus of the property so seized as aforesaid, after the satisfaction of said venditioni exponas, shall be delivered to the defendant, on demand; but if he shall fail to demand the same for ten days after such sale, the same shall become forfeited to the said agricultural society, and if the property so seized shall be found insufficient to satisfy said venditioni exponas and costs of execution, said justice of the peace shall, at any time thereafter, on request of the treasurer of said society, issue a fieri facias to collect the balance thereof.

Passed April 11, 1856.

AN ACT

To amend section three and section six of an act for the encouragement of agriculture, passed February 28, 1846.

SECTION 1. *Be it enacted by the General Assembly of the State of Ohio*, That section three of the above recited act be amended so as to read as follows: It shall be the duty of each county or district society to publish annually a list of awards, and an abstract of the treasurer's account in a newspaper of the district; and to make a report of their proceedings during the year, and a synopsis of the awards for improvements in agriculture and household manufactures, together with an abstract of the several descriptions of these improvements, and also make a report of the condition of agriculture in their county or district; which reports shall be made out in accordance with the rules and regulations of the Ohio State Board of Agriculture, and shall be forwarded to the State Board at their annual meeting in January in each year; and no subsequent payment shall be made from the county treasury unless a certificate be presented to the auditor, from the president of the State Board, showing that such reports have been made.

SEC. 2. That section six be amended so as to read as follows: There shall be held in the city of Columbus on the first Wednesday after the first Monday in January, an annual meeting of the Ohio State Board of Agriculture, together with the President of each County Agricultural Society, or their delegate therefrom duly authorized, who shall for the time being be ex officio members of the State Board of Agriculture, for the purpose of deliberation and consultation, as to the wants, prospects, and condition of the agricultural interests throughout the State; and at such annual meeting the several reports from the county societies shall be delivered to the President of the Ohio State Board of Agriculture, and the said president and delegates shall at this meeting, elect suitable persons to fill all vacancies in the Ohio State Board of Agriculture.

SEC. 3. That sections three and six be and the same are hereby repealed.

SEC. 4. This act shall take effect and be in force from and after its passage.

Passed February 20, 1861.

AN ACT

To protect agricultural fairs.

SECTION 1. *Be it enacted by the General Assembly of the State of Ohio*, That it shall be unlawful for any person to exhibit or show any natural or artificial curiosity for any price or gain, or shall set up to let or use for profit any swing, revolving swing, flying horses, or whirligigs within one-fourth of a mile of the fair ground of any agricultural society in this State, while the fair of such society is being held therein, unless such person shall first have obtained the written permission of the Board of such agricultural society to make such exhibition.

SEC. 2. That if any person shall violate the provisions of this act, he shall, on conviction thereof, be fined in any sum not less than one nor more than one hundred dollars; and all moneys derived from the violation of this act shall be appropriated to the support of common schools.

SEC. 3. This act shall take effect from and after its passage.

Passed April 6, 1861.

AN ACT

To provide for the creation and regulation of township agricultural societies.

SECTION 1. *Be it enacted by the General Assembly of the State of Ohio*, That when any number of natural persons of any township in the State of Ohio shall form an association for the

promotion of agriculture in such township, and shall, under their hands and seals, make a certificate, and acknowledge the same before a justice of the peace, in which shall be specified the name of the society, the objects of its formation, and the township in which it shall be located, and shall record the same in the recorder's office of the proper county, such society shall be deemed a body corporate, with succession, and with power to sue and be sued, plead and be impleaded, defend and be defended, contract and be contracted with; to make and use a common seal, and the same to alter at pleasure; and shall have power to purchase and hold, in fee simple, or to rent or lease such real estate as may be required as a site for holding fairs, not exceeding twenty acres, and to establish all necessary rules and regulations for the management of such fairs, and the legitimate business of the society.

SEC. 2. This act shall take effect on and after its passage.

Passed May 1, 1861.

LAW RELATING TO PUBLIC SHOWS.

AN ACT

To amend an act entitled "An act to regulate Public Shows," passed February 28, 1831.

SECTION 1. *Be it enacted by the General Assembly of the State of Ohio,* That so much of the first section of the act to which this is an amendment, as provides that it shall not be necessary for any exhibiter or exhibiters of any show allowed to be exhibited by said act, to obtain a permit from the county auditor, to show or exhibit in any incorporated town or city, where by the laws or ordinance of such town or city, such exhibiter or exhibiters may be required to obtain a permit or license from the municipal authority of said town or city, be and the same is hereby repealed.

SEC. 2. Before any person or persons shall be permitted to exhibit any public show; in any incorporated town or city in this State, he or they shall first be required to obtain a permit from the auditor of the county in which such town or city may be located, according to the provisions of the act to which this is an amendment, and the act to create a permanent agricultural fund, passed February 6, 1847, and all moneys paid into the treasuries of the several counties under the provisions of this act, shall be paid over and disposed of according to the provisions of the act above named.

SEC. 3. Nothing in this act shall be construed to interfere with the right or power of any incorporated town or city of this State, to impose a license upon all shows exhibited in such town or city in addition to that imposed by this act.

Passed March 21, 1849.

AN ACT

In relation to statistics of agricultural and mineral products.

SECTION 1. *Be it enacted by the General Assembly of the State of Ohio,* That it shall be the duty of the several township assessors in all the counties in the state, at the time of making the annual assessment of personal property for taxation, to collect the following items of statistics in addition to those already authorized by law, viz.:

First—The number of acres grown in clover, the number of tons of hay made from it, the number of bushels of seed obtained, and the number of acres of clover plowed under for manure.

Second—The number of acres planted in tobacco, and the number of pounds obtained.

Third—The number of (old and young) dogs, both male and female.

Fourth—The number of tons of pig-iron manufactured, and the bushels of stone-coal dug.

Fifth—The number of acres sown in flax, number of pounds of fibre gathered, and the number of bushels of seed obtained.

Sixth—The number of acres planted in sorgo, the number of gallons of syrup manufactured, and the number of pounds of sugar obtained.

Seventh—The number of pounds of maple sugar made, and the number of gallons of syrup manufactured.

Eighth—The number of pounds each of butter and cheese manufactured.

Ninth—The number of acres planted in potatoes, and the number of bushels obtained; and make a correct return thereof to the county auditors of their respective counties at the same time that a return of the enlisted property is made.

Sec. 2. That it shall be the duty of the county auditors to forward annually, on or before the first day of June, to the office of the Ohio State Board of Agriculture, the aggregate of each of the items of statistics enumerated in the first section of this act, together with the aggregate of each and every item of statistics of acreage and product, where acreage is enumerated, and the aggregate product where no acreage is enumerated, of all the agricultural statistics by law authorized to be returned to the auditor of state; together with the aggregate number and value of the horses, cattle, sheep and swine in the county, as sent to the office of state auditor

Sec. 3. This act to take effect from and after its passage.

Passed February 20, 1864.

AN ACT

To create a permanent fund for the Ohio State Board of Agriculture.

Whereas, On the 8th day of February, A. D. 1847, a bill was passed by the Ohio legislature, entitled "An act to create a permanent agricultural fund in the State of Ohio, and for other purposes;" which bill provides that the minimum of show licenses shall be twenty dollars, and that one half of the fund arising from show licenses throughout the state shall be set apart for the state agricultural fund; and said bill furthermore provides, that the fund arising from the sale of escheated lands shall also be set apart for the state agricultural fund; and,

Whereas, The aforesaid bill exonerates Hamilton county from the payment into the state treasury for the agricultural fund, of any portion of the show licenses or escheats acquired within said county of Hamilton; and,

Whereas, On the 29th of March, 1856, a bill was passed by the legislature of Ohio, authorizing the sum of six hundred dollars to be retained in the county in which an escheat might transpire; and,

Whereas, On the 16th day of April, 1862, the legislature of Ohio passed a bill which, in effect, virtually deprives the fund arising from escheat, from passing into the state treasury for the benefit of said agricultural fund; and,

Whereas, The Ohio State Board of Agriculture has derived an annual average sum of two thousand seven hundred and sixty dollars from the two sources of revenue indicated or authorized by the act of February 8, 1847: Therefore,

Section 1. *Be it enacted by the General Assembly of the State of Ohio*, That there is hereby appropriated from the general revenue not otherwise appropriated, for each of the years 1864 and 1865, the sum of three thousand three hundred dollars, for the encouragement and improvement of the agricultural interests of the state, in such manner as the State Board of Agriculture may deem most conducive to that object: Provided, that said State Board of Agriculture shall pay the sum of three hundred dollars annually to the Ohio Pomological Society; and the Treasurer of State is hereby directed to pay said sum to the president of Ohio State Board of Agriculture, on the warrant of the Auditor of State.

Sec. 2. That portion of the show license fund heretofore set apart for the state agricultural fund, and the funds arising from the sale of escheated lands set apart for the state agricultural fund, shall be collected as heretofore and paid into the state treasury, and be regarded in every sense as forming a part of the general revenue.

Sec. 3. This act to take effect from and after its passage.

Passed March 31, 1864.

RULES

For the Organization and Management of County and District Societies.

I. The officers of each Society shall consist of a President, Vice President, Treasurer, Secretary, and at least five Managers or Directors, who, together, shall constitute a Board of Directors for the management of the affairs of the Society, and shall hold their offices until their successors are duly elected.

II. Members of the Society must be residents of the county or district, must be over twenty-one years old, and must annually pay the sum of one dollar to the Treasurer.

III. The Treasurer shall keep a list of the members of the Society, so that he may be able to report to the State Board the number of members each year, and so that it may be ascertained who are entitled to vote for officers.

IV. The election for officers, for each County and District Society, shall be held in each year, at such time in January as the County or District Society may determine upon.

V. County or District Societies may open their premium lists to all persons, without restriction, except on field crops, which shall be confined to the county or district.

VI. Competitors for premiums must be members of the Society.

VII. All articles offered for premiums must be owned by the person offering the same, or by some member of his or her family.

VIII. Awarding committees must comply with the provisions of the law requiring competitors for premiums on crops and other improvements to furnish full and accurate statements of the process, expense of culture, production, &c.

IX. Competitors for premiums on crops shall be required to have the ground and its products accurately measured, and satisfactory proof, under oath, must be furnished by each competitor.

X. Each Society shall have duly prepared an annual report, and shall present the same to the State Board of Agriculture on or before the annual meeting of said Board, as prescribed to be held by the second section of the "Act for the encouragement of Agriculture," passed April 6th, 1861.

XI. Said report shall contain the following:

1. A list of the premiums awarded at the previous Annual Fair.

2. A copy of the published abstract of the Treasurer's account, as the same was published, in conformity with the first section of the above named act.

3. All statements of competitors for premiums on crops and other improvements in agriculture, detailing mode of tillage, &c., &c.

4. A general account of the proceedings of the Society, the number of its members, and the prospects of its progress and usefulness.

5. A statement of the principal crops raised in the county or district; an estimate of the amount of each raised; the average yield per acre; the striking characteristics of the previous season; the names of the destructive insects which may have injured the crops; and such other facts as will tend to give a full view of the state of agriculture in each county or district, so that the same may be embodied in the succeeding Annual Report, made by the State Board to the Legislature.